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Nematodes of the Caribbean

Prepared from Helminthological Abstracts 1932-1973

ANNOTATED BIBLIOGRAPHY NO. 19

COMMONWEALTH INSTITUTE OF HELMINTHOLOGY

1—Tropical Agriculture.

BRIANT, A. K.—"Tomato diseases in Trinidad." IX (3), 63-71, 1 table, 3 figs. [March, 1932.]

The common root-knot eelworm *Heterodera radicicola* is a frequent parasite on the roots of tomatoes in Trinidad. Its importance is due not only to the direct effect on the plant but also because the injuries to the root system probably make the plant more susceptible to attack by other organisms. R.T.L.

2—Plant Disease Reporter.

STEINER, G.—"Notes on nemic diseases." XVI (1), 2-3. [1932.]

Steiner records the occurrence of *Pathoaphelenchus* spp. associated with certain pathogenic symptoms in plants. The nematodes, not here described, were associated with a wood stain in long leaf pine in Louisiana and Texas, and with disease in a sugar cane plant from Jamaica. M.J.T.

3—Zoologischer Anzeiger.

STEINER, G. & LEHEW, R. R.—"*Hoplolaimus bradys* n. sp. (Tylenchidae, Nematodes), the cause of a disease of yam (*Dioscorea* sp.)." CI (9/10), 260-264. [1933.]

Steiner and LeHew give a detailed account of the morphology of *Hoplolaimus bradys* n. sp., found in the tuber of a yam exported from Jamaica.

Two other species of the genus, which is closely related to *Tylenchus*, are known. *H. bradys* differs from these in the structure of the lip region, which is rounded, faintly six-lobed and distinctly annulated, with anterior concave indentations in the bulbs of the spear, and also in the shape of the female tail which is obtusely conical. A key to the three species is given. M.J.T.

4—Journal of the Washington Academy of Sciences.

STEINER, G.—"A new species of the nematode genus *Aphelenchoides* living in the sugar cane." XXIV (3), 141-143. [1934.]

Steiner describes the occurrence and details the morphology of *Aphelenchoides heterophallus* n. sp., in the stalk of sugar cane from Jamaica.

A pure culture of the nematode was found in the discoloured axial portion of the cane. It is suggested that some association with an insect may be involved—probably a carrier relationship. The species is most closely related to species associated with bark beetles. A detailed morphological description of adult males and females is given. M.J.T.

5—*CARBONELL, D., 1938.—"La parasitologia en Venezuela y los trabajos del Dr. M. Nunez Tovar." Caracas, 420 pp.

6—WATERSTON, J. M., 1939.—"Annotated list of diseases of cultivated plants in Bermuda." Department of Agriculture, Hamilton, Bermuda, x+38 pp.

In a list, mainly composed of fungal diseases of cultivated plants occurring in Bermuda, Waterston reports *Heterodera marioni* on *Apium graveolens* (celery), *Cucumis sativus* (cucumber) and *Daucus Carota* (carrot), and *Aphelenchoides ritzema-bosi* on *Chrysanthemum morifolium* (garden chrysanthemum). T.G.

7—Plant Disease Reporter.

FOSTER, H. H., GARCIA FORTUÑO, M. & IRIZARRY RUBIO, G., 1942.—"Notes on diseases, decays, and disorders of tobacco in Puerto Rico during the 1941-42 season." 26 (11), 247-253.

A rather general, though only moderately severe, infection of tobacco with root-knot nematode was observed on an experimental plot at the Río Piedras Station. This disease does not seem to be serious or common in Puerto Rico, possibly because of the heavy clay soil and the periods of drought which occur. M.T.F.

8—Bulletin. Department of Science and Agriculture, Jamaica.

MARTYN, E. B., 1942.—"Diseases of plants in Jamaica." New Series No. 32, 34 pp.

In Part III of this comprehensive account of the chief diseases affecting crop plants in Jamaica, Martyn mentions the occurrence of the root-knot nematode, *Heterodera marioni*, as a parasite affecting tomatoes, cabbage, egg-plant, lettuce, cucumber and antirrhinum. Symptoms are briefly described and control methods suggested, including soil sterilization and bare fallowing accompanied with frequent stirring of the soil in dry weather. T.G.

9—Plant Disease Reporter.

FOSTER, H. H., VÉLEZ FORTUÑO, J. & IRIZARRY RUBIO, G., 1943.—"Notes on tobacco and tobacco diseases in Puerto Rico during the early part of the 1942-43 season." 27 (1), 8-11.

Root-knot due to *Heterodera marioni* is recorded on tobacco in seedbeds and field plots, causing severe stunting in some cases. Continuous growing of tobacco, and weather conditions favouring the eelworms, have probably encouraged the disease, which, it is considered, may become serious in the district with continued cultivation of the crop. M.T.F.

10—Revista. Facultad Nacional de Agronomía. Colombia.

ORJUELA NAVARRETE, J. E., 1944.—"Situación patológica de las plantaciones de caña de azúcar en las zonas del valle de Cúcuta, Villa del Rosario y regiones aledañas." 5 (21), 200–231.

This paper on diseases of sugar cane in Colombia, S. America, includes a note by F. J. Otoya on the nematodes found in the roots of sugar cane in the region of Cucuta. The worms are referred to the genus *Tylenchus*, but owing to lack of the necessary literature a specific determination was not made and the nematodes are merely spoken of as *Tylenchus* sp. [It would seem, however, from the description of the symptoms of disease produced in the roots, i.e. absence of hypertrophied tissue and the production of reddish coloured lesions, that the nematodes are, most probably, *Anguillulina similis* (Cobb, 1893), well known as a parasite of sugar cane roots.] Symptoms of disease in affected roots are described and soil conditions conducive to attack are dealt with as well as suggestions for control. T.G.

11—Revue Agricole. Guadeloupe.

ANAIS, D., 1947.—"La maladie vermiculaire [des bananiers]." 4 (6), 153–158.

Anais discusses a nematode infestation of banana roots [name of parasite unspecified], describes the symptoms shown in foliage and roots, and shows that there is a correlation between the amount of root injury and susceptibility to *Cercospora* leaf spot. He indicates the importance of ground cover in banana cultivation and, as a control measure, recommends the application of calcium cyanamide at the rate of 150–250 gm. around each tree at the beginning and end of the rainy season. He claims that by checking the nematode infestation by this means, the *Cercospora* disease is also checked. T.G.

12—Extension Circular. Department of Agriculture, Jamaica.

EDWARDS, W. H., 1948.—"Tomato pests and their control." No. 22, 11 pp.

Crop failures due to eelworms which penetrate the roots of tomatoes and cause galls are most frequent on irrigated areas of the alluvial plains in Jamaica, but are seldom met with in red soils. The only remedy is long-term rotation excluding tomato, tobacco and garden egg more often than once in five years. If infestation is likely, seedlings should be raised in sterilized or virgin soil and, on transplanting, rapid root growth should be encouraged by application of fertilizers, water and humus. M.T.F.

13—Notas Agronomicas. Estación Agrícola Experimental de Palmira, República de Colombia.

ESTRADA R., N. & VILLAMIL G., F., 1948.—"Experimento de campo sobre el control de nemátodos a base de D-D." 1 (1), pp. 1–5. [English summary pp. 4–5.]

In a field heavily infected with *Heterodera marioni*, and planted with New Pritchard variety tomato plants, no significant differences in the number of affected plants followed the injection of D-D mixture at the rates of 100 lb., 200 lb., and 300 lb. per acre, although there was a slight increase in the weight of fruit with 300 lb. per acre. R.T.L.

14—Report of the Director of Agriculture, Trinidad and Tobago.

ANON., 1949.—"Pests of vegetable crops." Year 1949, p. 15.

In Trinidad, *Heterodera marioni* causes appreciable damage in vegetable gardens of low fertility. R.T.L.

15—Notas Agronomicas. Estación Agrícola Experimental de Palmira, República de Colombia.

ANON., 1949.—"Resumen del informe de labores experimentales de la Estación Agrícola Experimental de Palmira, Junio de 1948 a Junio de 1949." 2 (5), 57–69.

In this résumé of experiments at the Palmira Agricultural Research Station there is brief mention of a disease of hops which appears to be due to *Heterodera marioni*. Work on the "rayadilla" disease of plantains, which may be associated with eelworm attack [see *Notas agron. Palmira*, 1948, 1 (3), 15–29], is continuing. B.G.P.

16—Plant Disease Reporter.

SZKOLNIK, M., 1950.—"Nematode root knot of cinchona in the Western Hemisphere." 34 (10), 305.

Nematode infections in roots of cinchona trees have not hitherto been found in the Western Hemisphere. Szkolnik now reports that Tarjan has identified *Meloidogyne incognita* in roots of *Cinchona micrantha* grown in an experimental planting at Finca Moca in Guatemala. A similar and perhaps identical nematode was also discovered in two-year-old stock of *C. succirbura* at Finca El Naranjo. In a few instances the infection was severe. R.T.L.

17Agronomía Tropical. Maracay.

BAIN, F. M. & FEDÓN C., S. A., 1951.—"Investigaciones sobre anillo rojo del cocotero." 1 (2), 103–130.

Red ring disease of coconut palms associated with the nematode *Aphelenchus* [*Aphelenchoides*] *cocophilus* is serious in Venezuela. Bain & Fedón review the published work on the disease, describe the symptoms and give an account of their inoculation experiments. Fruiting and non-fruiting palms of different ages were inoculated by the placing of infested material either around the roots or in the axils of the crown leaves. Results showed that infestation is not by way of the roots but takes place in the leaf axils; symptoms became obvious after about 2 months. The nematodes do not pass from tree to tree by way of the soil but are carried by ants and by *Rhyncophorus palmarum*. The ants which are normally found on plants in flower are common in the leaf axils of palms at the most susceptible age and are said to travel from tree to tree in search of food. The problem of control of red ring disease is an entomological one, it being necessary to control the ants as well as to burn infested palms. One palm tree in the experiments showed a high degree of resistance to the disease. M.T.F.

18—Acta Agronomica. Palmira.

PLAZAS M., G., 1951.—"Una afección de la *Musa paradisiaca* y otras Musáceas." 1 (3), 133–167.

The introduction, economic importance and diseases of the banana in Colombia, South America, are discussed briefly and are followed by a full description of the symptoms due to root-knot nematodes (*Heterodera marioni*), the life-history of the parasite and the methods of control. M.T.F.

19—FAO Plant Protection Bulletin. Rome.

LINFORD, M. B., 1952.—"Pineapple diseases and pests in Mexico." 1 (2), 21–25.

In Mexico, pineapple roots are remarkably extensive and healthy, save in the Loma Bonita area where *Heterodera marioni* is already widely established in the pineapple fields, both on the roots of pineapples and of weeds. Unidentified species of *Pratylenchus* and *Rotylenchus* which were frequently obtained from pineapple roots may cause serious disease if pineapple cultivation becomes intensive. R.T.L.

20—Plant Disease Reporter. Supplement.

STANDEN, J. H., 1952.—"Host index of plant pathogens of Venezuela." No. 212, pp. 59–106.

This host index of plant pathogens in Venezuela is stated in the introduction to be far from complete. The only plant parasitic nematode listed is *Meloidogyne* sp. in *Brassica oleracea* var. *capitata*, *Dahlia* spp., *Dianthus* spp., *Glycine max*, *Lycopersicum esculentum*, *Nicotiana tabacum* and *Solanum tuberosum*. [The sources quoted for these records are (i) "El reconocimiento de las enfermedades de las plantas cultivades en Venezuela, 1937–1941" by A. S. Muller in *Bol. Soc. venezol. Cienc. nat.*, 48, May–July 1941, and (ii) Faculdad de Ingenieria Agronomica de la Universidad Central, El Valle, Dto. Federal, Venezuela: "Mycological specimens collected by the Depto. de Fitopatologia".] R.T.L.

21—LORDELLO, L. G. E., 1953.—"Contribuição ao conhecimento dos nematódeos do solo de algumas regiões do Estado de São Paulo." Thesis, Escola Superior de Agricultura "Luiz de Queiroz" da Universidade de São Paulo, 80 pp. [English summary pp. 63–66.]

Lordello adds to our knowledge of the nematodes occurring in the soil in parts of the State of São Paulo by describing *Cylindrocorpus curzii zamithi* n.subsp., which is smaller than the smallest individual of *C. c. curzii* (Goodey, 1935), *Mononchus* (*Iotonchus*) *piracicabae* n.sp., which differs from *M.* (*I.*) *trichurus* by the absence of a denticle in front of the stomal dorsal tooth, and *Carcharolaimus pizai* n.sp., closely related to *C. dentatus* but differing in the posterior position of the vulva and in the organization of the labial cuticularized structure. The distribution of the 50 genera recorded for São Paulo is listed. The names *Xiphinema insignis* Loos, 1949 and *X. grandis* Steiner, 1914 are emended to *X. insigne* and *X. grande*. Some males of *Meloidogyne* were collected which had vestigial female organs. The geographical range of *Meloidogyne exigua* is extended by its discovery on coffee root galls in Chinchina (Colombia) by Dr. Viégas. An unidentified sporozoan was found in 88% of the specimens of the genera *Xiphinema*, *Dorylaimus* and *Pungentus* examined. Lordello considers the predacious nemas, especially *Mononchus* spp., the most important natural agents of control of the soil nematodes. R.T.L.

22—FAO Plant Protection Bulletin. Rome.

MULLER, A. S., 1953. "Plant disease problems in Central America." 1 (9), 136–138.

Although *Heterodera marioni* is found on a number of crops in many vegetable gardens in Central America (i.e. extending from the southern border of Mexico to the northern border of Colombia), it receives no special attention except in the case of tomatoes which do not survive long in heavily infested garden soils. R.T.L.

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23—Turrialba. Revista Interamericana de Ciencias Agrícolas.

TAYLOR, A. L. & LOEGERING, W. Q., 1953.—" Nematodes associated with root lesions in abacá." 3 (1/2), 8–13.

Three nematodes have been found associated with root lesions in abacá or Manila hemp (*Musa textilis* Née) in Costa Rica, Panama and Honduras. They were *Radopholus similis*, *Meloidogyne incognita* var. *acrita* and *Pratylenchus musicola* (Cobb, 1919). *P. musicola* caused more or less extensive lesions in the root cortex and the roots eventually rotted due probably to secondary invaders. Heavily attacked plants showed some evidence of arrested development. Lesions caused by *R. similis* resembled those containing *P. musicola*. *M. incognita* var. *acrita* did not cause much galling on the roots but was often found in small lesions and it obviously caused considerable damage. The infestation of abacá by *P. musicola* and *R. similis* and of two [unnamed] species of *Heliconia* by *P. musicola* are new host records. No special methods for controlling nematodes in abacá are known. J.B.G.

24—Agricultura Tropical. Bogotá.

CARDEÑOSA, R., 1954.—" Los nematodos y su control." 10 (11), 37–39.

In the valley of the Cauca river in Colombia, *Heterodera marioni* and *Radopholus similis* are increasingly serious pests on tobacco, tomatoes and other crops. Cardeñosa urges the control of these nematodes by rotations with relatively resistant crops such as maize, application of suitable fertilizers (calcium cyanamide followed by ammonium sulphate), covering of the soil with a thick layer of decomposing organic matter, etc. Chemicals should be used only in cases of severe infestation. Tests so far have shown that D-D mixture and ethylene dibromide (Dow W-40) are the nematicides of choice. M.McK.

25—Fitófilo. Mexico.

ALCOCER GOMEZ, L., 1955.—" Enfermedad de la palma de coco conocida como 'anillo rojo'." 8 (11), 8–11.

26—ST. VINCENT. **"Report of the Department of Agriculture, Forestry and Fisheries, St. Vincent, for the year ended 31st December, 1955."** Kingstown: Government Printer, 68 pp. (Received 22.6.60.)

The helminths affecting livestock on St. Vincent Island during 1955 were stomach worms in sheep and goats, the large roundworm and *Macracanthorhynchus* in pigs, and hookworms and large roundworms in dogs. In chickens, a rare case of eye-worm was recorded while tapeworm infection had dropped markedly. Little work has so far been done on eelworms which are nevertheless serious. *Aphelenchoides cocophilus* infection of low incidence occurred on coconut palms. G. I. Pozniak

27—Revista de Sanidad y Asistencia Social. Caracas.

DÍAZ-UNGRÍA, C., 1956.—" Nematodes de Venezuela. Especies señaladas hasta la fecha." 21 (5/6), 291–336.

Díaz-Ungría lists under hosts and under parasites the nematodes recorded from Venezuela up to 1956 and gives for each species the author, date and in some instances the habitat, and locality in Venezuela. The bibliography has 55 references. M.McK.

28—Memorias. Asociación de Técnicos Azucareros de Cuba.

PINEDA, F., 1956.—" Nemátodos parasíticos en la caña de azúcar." XXX Conferencia Anual, pp. 61–81.

Pineda reviews, from the published literature, the nematodes that have been reported as associates of sugar-cane. These are *Radopholus similis*, *Tylenchorhynchus martini*, *Anguina spermophaga* [Steiner, 1937 and not n.sp. as it appears in this paper], *Hoplolaimus coronatus*, *Meloidogyne javanica* and *Aphelenchoides heterophallus*. He states that Steiner has found the following nematodes on sugar-cane in Puerto Rico—*Pratylenchus* spp., *Helicotylenchus* spp., *Hoplolaimus* spp., *Ditylenchus* spp., *Tylenchus* spp., *Tylenchorhynchus*, *Psilenchus*, *Rotylenchus*, *Criconemoides*, *Aphelenchus*, *Aphelenchoides*, *Longidorus* and *Xiphinema*. There are 33 papers listed as references. J.B.G.

29—FENWICK, D. W., 1957.—" Red ring disease of coconuts in Trinidad and Tobago. Report." London: Colonial Office, 55 pp.

Fenwick describes investigations into *Aphelenchoides cocophilus* causing red ring disease in coconuts. The very low incidence of worms on the coconut weevil, *Rynchophora palmarum*, and the difficulty in removing them shed some doubt on the importance of this insect as a vector for the disease. The distribution of red ring tissue and of weevil damage is not consistent with the former arising from the latter. An almost constant feature of red ring infections is a mass of red ring tissue in the base of the tree with or without a cylinder of reddened tissue extending upwards for a varying distance. The breeding stages of the worm are always found near the top of the cylinder. This indicates that infestation of the trunk and leaves starts at the base. The presence of worms in the roots of infested trees (in two cases worms were found in roots of trees in which there was only very slight discoloration in the base of the trunk) and also of worms in the soil suggests entry via the roots. It is therefore possible that the disease is soil borne. This is supported by the fact that it appears to be more prevalent in swampy and badly drained areas. Dropped nuts suitable for planting were found to be infested with soil nematodes and in two cases *A. cocophilus* were found in the husks. This might be a factor in the spread of the disease to new areas. The disease normally affects trees less than ten years old but a few old trees were found dying from it. Symptoms in these trees were very variable and not at all typical of red ring in younger trees. The nuts on these trees were not infested. The symptoms of the disease in young trees are described—it is emphasized that diagnosis based on the general appearance of trees is uncertain—the presence of the characteristic reddened ring of tissue must be established and if possible confirmed by the presence of the worm. It is recommended that the status of the worm in soil be investigated, as well as its incidence in dropped nuts. The absence of basic knowledge on the culture and agronomy of coconuts is a severe handicap to any programme of research into red ring. D.W.F.

30 JAMAICA. **"Annual Report of the Ministry of Agriculture and Lands for the year ended 31st December, 1957."** Kingston: Government Printer, 81 pp. (Received 4.2.60.)

Habronema megastoma in a horse and *Ascaria* sp.[?] in a parrot were recorded for the first time for Jamaica. *Radopholus* sp. was found for the first time in association with citrus, being present in groves at St. Catherine, Manchester and Portland. *R. similis* caused greater losses among bananas during 1957 than in the past. G. I. Pozniak

31—**Plant Disease Reporter. Supplement.**

LITZENBERGER, S. C. & STEVENSON, J. A., 1957.—" A preliminary list of Nicaraguan plant diseases." No. 243, pp. 1–19.

In this list of Nicaraguan plant diseases nematodes [unspecified] are mentioned as infesting *Beta vulgaris*, *Brassica oleracea capitata*, *Crotalaria striata*, *Daucus carota* and *Lycopersicon esculentum*. M.T.F.

32—MERA S., O. 1957. [Agrónomo del Instituto de Fomento Tabacalero.] "Algunas observaciones sobre nemátodos en el tabaco." Agricultura Tropical. Bogotá, 13 (5), 319–322.

In the tobacco-growing zone of the Department of Santander, Colombia, tobacco has been grown for many years and is now severely damaged by eelworms. Root galling is described, indicating that the nematodes are *Meloidogyne* sp., although the name is not mentioned. It is recommended that infected tobacco should be destroyed and other crops grown or the land rested for a couple of years. M. T. Franklin

33 TRINIDAD & TOBAGO. **"Administration Report of the Agricultural Department for the year 1957."** Port of Spain: Government Printing Office, viii+49 pp. (Received 24.11.59.)

It is reported that *Radopholus similis*, which causes "Blackhead Toppling" of banana plants in Jamaica, has now been found in Trinidad, that *Meloidogyne* sp. proved to be the limiting factor in the growth of tomatoes at Gran Couva where other pests were kept under control by low volume spraying with D.D.T., and that investigations into red ring disease of coconut (*Aphelenchoides cocophilus*) are being initiated. G. I. Pozniak

34—**Span. London.**

FENWICK, D. W., 1958.—" Red ring of coconuts. A problem for the nematologist." No. 2, pp. 5–7.

After outlining the history of red ring disease of coconuts in Trinidad, Fenwick describes the symptoms and the position in which the causal nematode, *Aphelenchoides cocophilus*, is found in the plant at different stages of the disease. Infection probably starts at the base of the tree and there are indications that the nematodes enter by way of the roots. *A. cocophilus* has been found in the soil of coconut plantations and might possibly enter the husks of fallen nuts and so be spread to new plantations. Not enough is known to recommend control measures but soil fumigation might be practicable. Further research into the biology and host-parasite relationships of the nematode is needed. M.T.F.

35—**Plant Disease Reporter.**

LUCAS, G. B., 1958.—" Tobacco diseases in Panama." 42 (11), 1301.

Root-knot (caused by *Meloidogyne incognita*) and brown root rot (*Pratylenchus* sp.) were the nematode diseases of tobacco found by Lucas in Panama. *Helicotylenchus* sp. and *Trichodorus* sp. were found in the tobacco fields. J.J.H.

36—PINEDA, F., 1958. "Nemátodos parasíticos de la caña de azúcar de Cuba." **Memorias. Asociación de Técnicos Azucareros de Cuba.** XXXII Conferencia Anual, pp. 15–20. [English summary pp. 293–294.]

Pineda lists the genera of nematodes found in soil and root samples from 5 sugar-cane plantations in Cuba indicating which genera contain plant-parasitic species. Symptoms which can be caused by *Ditylenchus* and *Helicotylenchus* are given together with short unillustrated descriptions of the 2 genera. A new genus of the subfamily Tylenchinae is to be described later. M.T.F.

37—ALCOCER GOMEZ, L., 1959. [Instituto Politecnico Nacional, Mexico, D.F.] "Morfología y biología de un nemátodo aislado de las raíces nodulares de plantas de jitomate, *Lycopersicum esculentum* Mill., de las principales regiones agrícolas de México." Thesis, Mexico, 43 pp.

The author describes nematodes of an unidentified species of *Heterodera* [=*Meloidogyne*] found in root galls of tomato and other cultivated plants in Mexico. The gross morphological characters of the principal stages of the nematode are given and some account of the histology of the infested roots. Development of the eggs and hatching of the larvae *in vitro* are described, and the life-history of the nematode in pot-grown tomatoes. Second generation larvae appeared in about 78 days in sandy soil and 98 days in clay soil. Three nematicides were tested in a pot experiment: commercial formaldehyde at concentrations of 5%, 3% and 2% applied at 5 litres per sq. m., D-D or Nemagon at 3, 2 and 1 ml. per sq. m. Infested soil was used and tomato seed was sown. Germination and growth were normal in the formaldehyde and D-D pots but with Nemagon both were retarded. After 90 days' growth the roots were examined and light infestation was found in the formaldehyde and D-D series but the Nemagon series appeared free from infestation. Detailed results are not given. M. T. Franklin

STEINER, G., 1959.—"Los nemátodos: otra plaga de las plantaciones de caña de azúcar de Puerto Rico." 48 (1), 75–78.

This is a general article indicating the different kinds of damage which may be caused by nematodes. They are thought to cause loss of yield from sugar-cane plantations in Puerto Rico. Suggestions are given for control by methods of cultivation and the use of nematicides. M.T.F.

39—TOLER, R. W., CUELLAR, R. & FERRER, J. B., 1959. [Dept. of Plant Pathology, North Carolina State College, Raleigh, North Carolina, U.S.A.] "Preliminary survey of plant diseases in the Republic of Panama, 1955–1958." **Plant Disease Reporter, 43** (11), 1201–1203.

Plant-parasitic nematodes encountered during this survey included severe infections of *Meloidogyne* sp. on *Cucumis melo, Coffea arabica, Vigna sinensis, Cucumis sativus* and *Citrullus vulgaris*. Lighter infections occurred on banana, *Capsicum* spp. and *Arachis hypogaea*. There were severe infections of *M. incognita* on *Solanum melongena* and *Nicotiana tabacum* and a light attack on *S. tuberosum*. *Aphelenchoides oryzae* was found on rice and *A. cocophilus* on *Cocos nucifera*. *Tylenchorhynchus* sp., *Helicotylenchus* sp., *Trichodorus* spp. and *Xiphinema* spp. were encountered on several crops but their effect was not ascertained except for *Pratylenchus* sp. on *Coffea arabica* where it was considered severe in nurseries. D. J. Hooper

40—CHITWOOD, B. G. & BERGER, C., 1960. "Nemic parasites of coffee in Guatemala." [Abstract of paper presented at the 52nd Annual Meeting of the American Phytopathological Society, August 1960.] **Phytopathology, 50** (9), 631.

41—CHITWOOD, B. G. & BERGER, C. A., 1960. "Preliminary report on nemic parasites of coffee in Guatemala, with suggested *ad interim* control measures." **Plant Disease Reporter, 44** (11), 841–847.

A list of 23 nematodes reported in the literature as suspected parasites of coffee is followed by preliminary observations on nematodes found by the authors in and around coffee roots in Guatemala. These include *Meloidogyne* spp., *Pratylenchus coffeae, Helicotylenchus erythrinae, Ditylenchus procerus, Aphelenchoides coffeae* and *A. bicaudatus*. Suggestions are made for increasing coffee production by the use of healthy seedlings and the culture as shade or green manure of plants resistant to nematodes. An annotated list of suitable plants is given. The nematodes mentioned are all given English names, many of them new, such as "Brasiloid pyroid coffee nema" for *Meloidogyne exigua* and "Southernoid pyroid coffee nema" for *M. incognita*. M.T.F.

42—CUELLAR S., R., 1960. "Phytonematology in Panama and Central America." **Proceedings. Soil and Crop Science Society of Florida,** 19th Annual Meeting (1959), pp. 430–435.

This is a report on the nematode diseases of the principal crops in Panama and Central America and on their control. Red ring disease of coconuts caused by *Aphelenchoides cocophilus* [now *Rhadinaphelenchus cocophilus* (Cobb, 1919) Goodey, 1960; see Helm. Abs., 30, No. 1001] is described but no adequate control measures are yet known. *Meloidogyne exigua*, the principle cause of decline in coffee plantations, probably also attacks the shade trees, mainly *Inga* spp. *Coffea arabica* and *C. robusta* are susceptible but *C. liberica* and *C. excelsa* appear to be unaffected. Bacterial wilt on tomatoes is nearly always associated with root-knot and tests showed that nematode injury facilitates the entrance of bacteria. Five nematicides were tested against tomato root-knot, D-D being the most effective. Economic losses on tobacco are caused by *M. incognita, Helicotylenchus* spp. and *Pratylenchus* spp. There is a short section on quarantine in Panama. M.C.G.

43—JAMAICA, 1960. **"Annual report of the Ministry of Agriculture and Lands for the year ended 31st December, 1958."** Kingston: Government Printer, 92 pp. [Helminths pp. 43, 61–62.]

Following the discovery of the association of *Radopholus* sp. with citrus and the outbreak of *R. similis* among bananas in 1957 it is feared that nematodes may be causing more damage to Jamaica's commercial crops than was hitherto suspected. The intermediate host of *Fasciola hepatica* in Jamaica has been identified as *Lymnaea cubensis*. J. W. Smith

44—SCHIEBER, E. & SOSA, O. N., 1960. [Instituto Agropecuario Nacional, Guatemala, C.A.] "Nematodes on coffee in Guatemala." **Plant Disease Reporter, 44** (9), 722–723.

Meloidogyne exigua and *Pratylenchus coffeae* were recovered from soil and root samples taken in coffee nurseries in Guatemala. Infested plants showed poor growth as seedlings and leaves turned yellow to brown. Some species of coffee are more resistant than others to these two plant-parasitic nematodes. H. R. Wallace

45—AYALA, A., 1961. "An analysis of the quantitative and qualitative composition of the nematode populations in pineapple fields in Puerto Rico." **Journal of Agriculture of the University of Puerto Rico, 45** (4), 265–299. [Spanish summary pp. 296–297.]

A survey in Puerto Rico revealed 23 genera of known and suspected plant-parasitic nematodes in and about the roots of pineapple. *Rotylenchus* and *Helicotylenchus* were the most commonly recovered genera. *Meloidogyne* was found in the northern part of the island. A.G.W.

46—DAO D., F., 1961. "El nematodo del ajo *Ditylenchus dipsaci* (Kühn, 1858, Filipjev 1936) y medidas de control." **Ingeniería Agronómica. Caracas**, No. 6, pp. 26–28.

In this well illustrated general article, Dao reports *Ditylenchus dipsaci* on onions in Venezuela. He explains that biological races of the nematode occur and that these races can only be distinguished from each other by differences in host ranges. He mentions that *D. myceliophagus* and *D. destructor* are recognized as separate species and that *D. dipsaci*, as at present constituted, contains only obligate parasites. The histological effects of *D. dipsaci* in plants are described, including the production of a pectinase which dissolves the middle lamellae of cells to produce cell rounding and separation. Control of onion bloat by drenching soil with formalin and the use of chloropicrin and D-D as pre-plant soil treatments are referred to. Phosdrin gave a 90% kill of *D. dipsaci* during *in vitro* tests. C.D.B.

47—FLORES-BARROETA, L. & HIDALGO-ESCALANTE, E., 1961. "Estudios fitonematológicos de suelos mexicanos. I." **Revista Ibérica de Parasitología, 21** (2), 221–237. [English summary pp. 231–232.]

The authors claim to have found *Rotylenchus bradys*, *Aphelenchoides hodsoni* and *Acrobeloides cubäensis* in Mexican soils. They describe and figure *A. tlaxcalcensis* n.sp. from the same habitat. [The figures indicate that the specimens were in very poor condition and it is doubtful if they could be recognized again with certainty.] J.B.G.

48—ROMÁN, J., 1961. "A new species of the genus *Helicotylenchus* (Nematoda: Hoplolaimidae) attacking sugarcane." *J. Agric. Univ. P. Rico*, 45 (4), 300–303. [Spanish summary pp. 302–303.]

Helicotylenchus concavus n.sp. from soil around the roots of *Saccharum officinarum* at San Sebastián, Puerto Rico, resembles *H. platyurus* but is smaller (0·63 to 0·78 mm.), has a shorter stylet (28–29μ) and a slight concavity on the dorsal side of the tail. The joining of the 2 inner incisures at the 9th or 10th annule behind the anus distinguishes it from other members of the genus. S.C.C.

49—ROMÁN, J., 1961. "Control of nematodes attacking sugarcane." **Journal of Agriculture of the University of Puerto Rico, 45** (3), 194–195.

Helicotylenchus, *Rotylenchus*, *Tylenchorhynchus*, *Pratylenchus*, *Criconemoides*, *Hemicriconemoides* and *Meloidogyne* are the most common genera of nematodes parasitic on sugar-cane in Puerto Rico. Dibromochloropropane applied in irrigation water increased seed germination and plant height and decreased numbers of soil nematodes. J.E.P.

50—SHIEBER, E., 1961. "Parasitic nematodes in dioscorea in Guatemala." **Plant Disease Reporter, 45** (6), 425.

In a preliminary survey *Dioscorea floribunda*, *D. composita* and *D. spiculiflora* showed disease symptoms and were parasitized by *Meloidogyne arenaria*, *M. incognita* and *Heterodera* sp. *M. arenaria* was also found on *Solanum aviculare* and *Caladium* sp., both new host records. M.T.F.

51—SCHIEBER, E. & LASSMANN K., D., 1961. "Root-knot nematode on *Dioscorea* in Guatemala." **Plant Disease Reporter, 45** (12), 981.

Further observations [for abstract of previous work see Helm. Abs., **31**, No. 225] have shown that *Meloidogyne incognita* is the predominant nematode species attacking *Dioscorea floribunda*, *D. composita* and *D. spiculiflora* in Guatemala and constitutes a potential threat to the crop. M.T.F.

52—SCHIEBER, E., SOSA, O. N. & ESCOBAR, P., 1961. [Instituto Agropecuario Nacional, Guatemala, C. A.] "Root-knot nematode on kenaf in Guatemala." **Plant Disease Reporter, 45** (2), 119.

In a preliminary survey of the Pacific coast area of Guatemala *Meloidogyne incognita* var. *acrita* was found for the first time. It attacks kenaf (*Hibiscus cannabinus*) causing stunting and chlorosis above ground and destruction of secondary roots and galling of the root system. The disease occurs in circular patches. M. T. Franklin

53—AYALA, A., 1962. "Occurrence of the nematode *Meloidogyne javanica* on pigeonpea roots in Puerto Rico." **Journal of Agriculture of the University of Puerto Rico,** 46 (2), 154–156.

Ayala reports *Meloidogyne javanica* on pigeon pea (*Cajanus cajan*) roots for the first time in Puerto Rico. One of the symptoms was pronounced proliferation behind attacked root tips. A.G.W.

54—HOOF, H. A. VAN & SEINHORST, J. W., 1962. "*Rhadinaphelenchus cocophilus* associated with little leaf of coconut and oil palm." **Tijdschrift over Plantenziekten,** 68 (5), 251–256. [Dutch summary p. 255.]

Van Hoof & Seinhorst review the literature on "little leaf" disease of coconut and oil palm. In Surinam the deformed little leaves of both plants have suberized patches on the inner side of the main vein of the leaf stalk correlated with *Rhadinaphelenchus cocophilus* feeding ectoparasitically on the young leaves folded in the bud. A correlation with red ring disease of coconut might be expected but was not found. Inoculation of oil palms with *R. cocophilus* in the rainy season caused "little leaf" disease in one case out of 5. The disease also occurred in British Guiana. J.B.G.

55—JENKINS, W. R. & BIRD, G. W., 1962. "Nematodes associated with wild yam, *Dioscorea* sp., with special reference to the pathogenicity of *Meloidogyne incognita incognita*." **Plant Disease Reporter,** 46 (12), 858–860.

Of the plant-parasitic nematodes found in or around the roots of *Dioscorea* sp. in Guatemala, *Meloidogyne incognita incognita, Pratylenchus brachyurus* and *Criconemoides* n.sp. [not named or described] were predominant. Infection of feeder roots by *M. incognita incognita* resulted in normal gall formation with "giant cells" between the developing females and the stele, while in storage roots the female and its egg-sac became enclosed in a periderm wound resulting in a "stone cell", from which the authors claimed larvae rarely escaped. A.G.W.

56—THORNE, G. & SCHIEBER, E., 1962. "American dagger nematode (*Xiphinema americanum*) on coffee in Guatemala, with suggestions for nematode control in nurseries." **Plant Disease Reporter,** 46 (12), 857.

Xiphinema americanum were found in most soils from coffee farms in 3 areas in Guatemala and occurred in very high numbers on one farm where trees were being abandoned. *Meloidogyne* spp. and *Pratylenchus* spp. were also frequently observed. It is suggested that nursery soils should be treated with a soil fumigant such as D-D to enable healthy planting stock to be grown; seedlings could be grown in individual bags of sterile soil. Young trees should not be planted where old ones have stood. D.J.H.

57—TRINIDAD & TOBAGO, 1962. "Annual report of Research Station, 1961." *Champs Fleurs: Trinidad & Tobago Coconut Research Ltd.*, 203 pp. [Helminths pp. 4–19, A1–T3.]

Most of the year's work was on the red-ring disease of coconuts. Individual projects included studies on *Rhadinaphelenchus cocophilus* in the soil, on the body and in the gut of the palm weevil, *Rhynchophorus palmarum*; on the natural spread of the disease; on symptomology of the disease; on laboratory and field screening of nematicides; on the use of arsenic as an alternative to cutting and burning infected trees. D.W.L.

58—AYALA, A. & ROMÁN, J., 1963. "Distribution and host range of the burrowing nematode in Puerto Rican soils." *J. Agric. Univ. P. Rico.*, 47 (1), 28–37. [Spanish summary p. 36.]

Radopholus similis was found in the roots of only 4 of about 100 species of crop plants in Puerto Rico. The nematodes caused root rot and ultimately destruction of plantations of *Musa paradisiaca* and *M. sapientium*. *R. similis* was found mostly in northern and central Puerto Rico, associated with ornamentals, plantain and banana. Sources of infection and appropriate control measures are discussed. The heaviest nematode populations were found in moist heavy clays of the mountains. The race of *R. similis* parasitizing banana could not infect citrus and sugar-cane and was probably distinct from the race associated with coffee since there was no cross-infection. Of 6 nurseries of ornamentals surveyed, limited infection with *R. similis* was found in 2, while in a 3rd, the nematodes were a serious problem. Roots of ornamentals were affected by *Meloidogyne incognita, Helicotylenchus nannus, Rotylenchulus reniformis, Pratylenchus* spp., *Tylenchus* spp. and *Trichodorus* sp. in decreasing order of occurrence. The following 5 species are probably new hosts of *R. similis* in Puerto Rico: *Anthurium acaule, Heliconia aurantiaca, Philodendron pertusum, Pothos aureus* and *Gossypium hirsutum* var. *punctatum*. Only 8 of 25 plant species studied were affected by *R. similis;* all but one belonged to the Araceae. Non-cultivated *G. hirsutum* and *Coffea arabica* were also attacked. Nematodes were recovered from roots of shaded coffee plants at about 2,500 ft. Roots of plantain, citrus and sugar-cane, even when closely associated with coffee roots, were free of the nematode. S.W.A.

59—JAMAICA, 1963. "Report of the Ministry of Agriculture and Lands for 1960." **Kingston: Government Printer,** 109 pp. [Helminths pp. 48–49, 50, 53, 55, 70–71.]

Pratylenchus coffeae and *Meloidogyne arenaria* are reported on coffee. *Tylenchulus semipenetrans* is not regarded as a serious pest of citrus in Jamaica. A new species of *Rotylenchulus* was found associated with coconut palms in areas where lethal yellowing occurred in both Jamaica and Key West, Florida. The specificity of *Radopholus similis* to banana was investigated. The effect of parasitic gastroenteritis on the live-weight gains of cattle was studied. J.W.S.

60—PERRY, V. G., HUGHES, I. W. & MANUEL, E. A., 1963. "Some plant nematodes of Bermuda." **Proceedings of the Soil and Crop Science Society of Florida,** 22nd Annual Meeting (1962), pp. 135–138.

In a survey of plant-parasitic nematodes in Bermuda 44 samples of soil and roots were examined. *Rotylenchus reniformis* was wide-spread and caused damage to *Vigna sinensis*. Decline of banana is thought to be due partly to *Meloidogyne incognita* and partly to *R. reniformis*. Spiral nematodes (*Helicotylenchus* spp.) were found frequently and are suspected of damaging *Cynodon dactylon* golf greens. One citrus grove was showing slow decline in the presence of *Tylenchulus semipenetrans*. *Belonolaimus longicaudatus* was found for the first time outside the U.S.A. New host records include: *Rotylenchulus reniformis* in *Musa cavendishii*, *Aphelenchoides ritzemabosi* in *Salvia farinacea* and *Meloidogyne incognita* in *Pandanus veitchii* and in *Scabiosa atropurpurea*. On native hosts in uncultivated areas, *Xiphinema americanum* and *Helicotylenchus erythrinae* are recorded. M.T.F.

61—ROMÁN, J., 1963. "Sugar: an effective but expensive nematocide." *J. Agric. Univ. P. Rico.* 47 (1), 54–55.

Trials were conducted in Puerto Rico on control by sugar of *Meloidogyne incognita* and *Rotylenchus reniformis* on tomato. Cane sugar was mixed with infested soil at the rates of 1 lb. of sugar to every 10, 50, 100 and 200 lb. of soil. Average nematode control 20 days after treatment was about 99, 98, 84 and 30% respectively, while the untreated pots had an average nematode increase of about 198%. Tomato plants in the treated pots showed improvement over controls except at a sugar concentration of 1:10, which was toxic. Best growth was evident with the 1:200 treatment. Root-knot was completely controlled in the 1:50 and to a great extent, in the 1:100 and 1:200 treatments. Although sugar is readily available and non-toxic to animals, it is not economical on a large scale. S.W.A.

62—TRINIDAD & TOBAGO, 1963. "Annual report of Research Station, 1962." *Champs Fleurs: Trinidad & Tobago Coconut Research Ltd.*, 42 pp. [Helminths pp. 6–36.]

Research projects continued to be concerned mainly with the behaviour and biology of *Rhadinaphelenchus cocophilus* and the pathology and control of red-ring disease. D.W.L.

63—WOLFF SCHOEMAKER, R. L. P., 1963. "*Gracilacus peperpotti* n.sp. (Nematoda, Paratylenchidae) found in a Surinam coffee plantation soil." Nematologica, 9 (2), 296–299. [German summary p. 299.]

Gracilacus peperpotti n.sp. (10 females, 8 males), from soil about the roots of *Coffea liberica* at Plantation Peperpot, Surinam, is described and figured. It differs from *G. elegans* in having a shorter stylet and from all other species of *Gracilacus* in having 2 lateral lines. A key to 16 species of the genus *Gracilacus* is presented. A.D.B.

64—AYALA, A. & RAMÍREZ, C.T., 1964. "Host-range, distribution, and bibliography of the reniform nematode, *Rotylenchulus reniformis*, with special reference to Puerto Rico." *J. Agric. Univ. P. Rico*, 48 (2), 140–161.

The reniform nematode is one of the most common parasitic nematodes in Puerto Rican soils and is associated with most of the agricultural crops. *Rotylenchulus reniformis* is usually encountered but morphological and pathogenic differences of different populations suggest that other undescribed species are present. A list of the published hosts of *Rotylenchulus* spp. and *R. reniformis* is given including previously unpublished records from Puerto Rico and the neighbouring island of Caja de Muertos. Published hosts of *R. queirozi*, *R. parvus*, *R. borealis* and *R. leiperi* are also given. There are 201 different hosts from 15 countries. The records are marked to indicate whether they are based on field or green-house observations. 89 host plants were found in Puerto Rico, 74 of which are new hosts for *R. reniformis* and 15 for *Rotylenchulus* spp. D.J.H.

65—CAMPOS VELA, A., 1964. "Negative report on the existence of the golden nematode (*Heterodera rostochiensis* Woll) in Mexico." [Abstract.] Phytopathology, 54 (5), 501.

Campos Vela describes cysts of *Heterodera* commonly found on the roots of *Salanum rostratum* in Mexico. They closely resemble *H. rostochiensis* but it is claimed that they are not this species. The cysts are round with an average Granek ratio of 2·5 (range 1·7 to 3·6). There is a golden phase in cyst development and a subcrystalline layer in young specimens. In tests, neither *S. tuberosum* nor *Nicotiana tabacum* were infected. No evidence of the presence of *H. rostochiensis* on potatoes was found in a search of the main potato-growing areas of Mexico. M.T.F.

66—DOMINICA, 1964. "Report of the Department of Agriculture and Forestry for 1960." Roseau: 27 pp. [Helminths p. 5.]

A survey by the Banana Board of Jamaica revealed black-head disease to be wide-spread on the island of Dominica. Control measures, including the use of chemicals and certain cultural practices, were demonstrated and outlined for local adoption. J.W.S.

67—JAMAICA, 1964. "Report of the Ministry of Agriculture and Lands for 1961." Kingston: Government Printer, 130 pp. [Helminths pp. 61, 66, 78, 79-80.]

In 1961, 1,217 soil and root samples from various fruit trees were examined for nematodes; no new genera were added to the 18 known from previous surveys. Laboratory trials indicate that an average of less than 3 root-knot nematode larvae per 300 c.c. of soil in fields prepared for planting would not be particularly detrimental to 90/120-day vegetable crops subsequently planted there. Helminthiasis is becoming a major disease problem, especially in calves and small stock including poultry. Further studies were made of parasitic gastro-enteritis in cattle. 4 birds (*Arrapondula montezuma*) imported into a zoo from Costa Rica harboured *Diplotriaena agelaius*, not previously recorded in Jamaica. J.W.S.

68—LOOF, P. A. A., 1964. "Free-living and plant-parasitic nematodes from Venezuela." Nematologica, 10 (2), 201–300. [German & Spanish summaries pp. 296–298.]

Loof describes a collection of nematodes made by Oostenbrink in Venezuela in 1962. The collecting localities and associated plants, where applicable, are indicated and altogether 219 species were found. Tropical and subtropical species were found at lower altitudes but species common to temperate climates occurred in the mountains. 95 species are described and of these 24 are new. *Mesorhabditis capitata* n.sp. has a shallower mouth cavity than that of *M. szunyoghyi* and its vulval lips project; *Eucephalobus pulcher* n.sp. is smaller, its tail longer and the cuticle annulation is much coarser than in *E. longicaudatus*; *Acrobeles undulatus* n.sp. is smaller than *A. thornei* and has narrower annulation; *Tylenchorhynchus contractus* n.sp. is smaller than *T. striatus* and its head is more rounded; *Peltamigratus pachyurus* n.sp. has a differently shaped tail from *P. holdemani* and its cuticle is also different; *Criconemoides oostenbrinki* n.sp. is very like *C. antipolitanus* but the posterior margin of the female annules is smooth; *Bursaphelenchus digitulus* n.sp. is unique in that the vulva is at 85%; *B. gonzalezi* n.sp. differs from *B. fungivorus* in having a subdorsal caudal papilla; *Chronogaster daoi* n.sp. differs from *C. alata* by having no longitudinal striae on the cuticle; *Mononchus venezolanus* n.sp. differs from *M. papillatus* by being larger and having no ventral ridge in the stoma; *Mesodorylaimus globiceps* n.sp. differs from *M. tenellus* by the more offset head and anterior position of the vulva; *Eudorylaimus morbidus* n.sp. is smaller and has a shorter tail than *E. hastatus*; *Drepanodorus orthodon* n.sp. is smaller than *D. leptocephalus* and has an almost straight spear; *Discolaimus affinis* n.sp. differs from *D. major* in the posterior vulva; *D. mucurubanus* n.sp. differs from *D. texanus* in shape of head, oesophagus and cardia; *Tylencholaimus leptonchoides* n.sp. has a much longer tail than *T. nikkoensis*; *Carcharolaimus drepanodon* n.sp. is unique in its curved spear; *Dorylaimellus longicollis* n.sp. has a very long oesophagus, an anterior oesophageal expansion and an anterior excretory pore; *D. spicatus* n.sp. differs in length and shape of tail from *D. virginianus*; *Dorylaimellus nygellurus* n.sp. has a unique tail shape; *Dorylaimoides porifer* n.sp. has a more offset head and a longer posterior part of the oesophagus than *D. paulbuchneri*; *Doryllium longicaudatum* n.sp. is unique in its elongate tail; *Tyleptus gymnochilus* n.sp. has no inner liplets and has a shorter oesophagus than *T. projectus*; *Alaimus striatus* n.sp. is unique in having a longitudinally striated cuticle.

Cont.

Criconemoides citri is made a synonym of *C. sphaerocephalus*; *Mesodorylaimus annulatus* has longitudinal striae and is replaced in *Dorylaimus*; *Eudorylaimus intrastriatus* is transferred to *Discolaimoides*; *Thornenema limnophilum* is transferred to *Dorylaimoides*; *Tyleptus* is replaced in the Leptonchidae. J.B.G.

69—RAMÍREZ, C. T., 1964. "*Hoplolaimus puertoricensis* n.sp. (Nematoda: Hoplolaimidae)." **Journal of Agriculture of the University of Puerto Rico**, 48 (2), 127–130.

Hoplolaimus puertoricensis n.sp. (female only), from sugar-cane fields in Puerto Rico, is described and figured. It is said to be distinguished by having only 3 head annules and 5 oesophageal gland nuclei. J.B.G.

70—ROMÁN, J., 1964. "*Belonolaimus lineatus* n.sp. (Nematoda: Tylenchidae)." **Journal of Agriculture of the University of Puerto Rico**, 48 (2), 131–134.

Belonolaimus lineatus n.sp., from about the roots of sugar-cane in Puerto Rico, is described and figured. It is distinguished by having four incisures in the lateral fields and by longitudinal striae in the oesophageal region. The intestine continues as a diverticulum into the tail of the female. J.B.G.

71—SHER, S. A., 1964. "Revision of the Hoplolaiminae (Nematoda) IV. *Peltamigratus* n.gen." **Nematologica**, Year 1963, 9 (3), 455–467. [French summary p. 467.]

Peltamigratus n.g. is proposed with *P. christiei* (Golden & Taylor, 1956) n.comb. for *Scutellonema christiei* as the type species; this genus differs from *Scutellonema* and *Aorolaimus* by the absence of lip striation, the large phasmids which are situated anteriorly to the anus and not opposite one another and the indented male caudal alae. A key to 5 species of *Peltamigratus* is given and *P. christiei* is redescribed. *P. luci* n.sp. from pineapple (*Ananas sativus*) soil in Martinique is distinguished from *P. christiei* by the shorter spear and in that the narrow distal annules of the female tail are not deeply constricted. *P. holdemani* n.sp., collected in jungle soil from the Coto Valley, Costa Rica, differs from *P. luci* by the small epiptygma in the female and the slight indentations of the male caudal alae. *P. macbethi* n.sp., from soil around potato (*Solanum* sp.) at Cagua, Argua, Venezuela, differs from *P. christiei* by the inconspicuous incisures of the lateral field, shorter spear, female tail without deeply indented constrictions of the annules, slightly indented caudal alae and the usually closer proximity of the phasmids. *P. nigeriensis* n.sp., distinguished from *P. luci* by the female tail which has wider distal annules and fewer total caudal annules, was collected from savannah grass soil at mile marker 13 on Olorunda-Meko Road, 26 miles from Abeokuta, Nigeria. Phylogenetically, *Peltamigratus* is thought to lie between *Scutellonema* and *Aorolaimus*. P.R.T.

72—STEINER, G. & BUHRER, E. M., 1964. "The plant-nematode problem of the American Tropics." **Journal of Agriculture of the University of Puerto Rico**, 48 (2), 69–100.

This article discusses nematode problems of the American Tropics and is compiled by Buhrer from notes of the late Dr. G. Steiner. The apparent rapid exhaustion of tropical soils under cultivation is due more to organisms present, especially nematodes, rather than to a depletion of mineral and organic elements. It is now realised that the "shifting of cultivation" long practised in the American Tropics is a means of reducing and avoiding nematodes and other soil pests. However, the successful monoculture of sugar-cane and, to some extent, pineapple is probably due to the reduction in nematodes and other pests caused by the intensive cultivation and preparation of the soil between crops. The ecological basis of plant-nematode problems and the parasitism of nematodes on and in plants are discussed. The development of *Meloidogyne* spp. is described with comments on their adaptation to parasitism. *Radopholus* spp. are considered in their role as migratory parasites. That *R. similis* has not been reported in citrus-growing areas other than Florida and that attacks on sugar-cane have only been reported from the Hawaiian Islands and Louisiana, suggest that *R. similis* is a species group. An emended generic diagnosis is suggested for *Radopholus*. *Tylenchus* [=*Radopholus*] *similis* of Cobb, 1915, is considered to differ from *T. similis* Cobb, 1893, but it is not named. An intra-cellular infection of *R. similis* in roots of *Musa paradisiaca* is reported and illustrated. Records of *Meloidogyne* spp. on coffee are discussed and it is noted that *M. exigua*, as recorded by Goeldi in 1887, was more virulent, killing trees, than shown by later records of *Meloidogyne* attacks. The identity of *M. exigua* is considered to be inadequately established. Cultivation practices of the Incas, Mayas and Aztecs suggest that nematodes were a problem in early agriculture. Little work has been done on tropical plants resistant to nematodes but in Puerto Rico *Cajanus cajan* and *Spathodea campanulata* were resistant to *Meloidogyne* spp. D.J.H.

73—TARJAN, A. C., 1964. "Distribution of plant-parasitic nematodes on citrus and other crops in Puerto Rico." **Plant Disease Reporter**, 48 (5), 375–378.

The results of a survey of plant-parasitic nematodes associated with citrus, ornamentals and various other fruit and crop plants in Puerto Rico are given. 31 soil and root samples were taken from cultured and wild plants in 13 localities. Of the 18 genera of nematodes identified *Helicotylenchus dihystera*, *Tylenchus* spp., *Tylenchulus semipenetrans* and *Xiphinema* spp. were the commonest. *X. basiri* was found associated with citrus. *T. semipenetrans* was not present in all citrus samples. J.W.

74—TARJAN, A. C., 1964. "Distribution of plant-parasitic nematodes on citrus and other crops in Puerto Rico." [Abstract.] **Phytopathology**, 54 (5), 501.

Thirty-one soil and root samples from assorted cultured and wild plants were obtained from 13 locations in Puerto Rico. 18 genera of plant nematodes were found associated with these plants. *Xiphinema basiri*, reported previously only from India, was found associated with citrus. *Tylenchulus semipenetrans* was not found in all citrus samples, suggesting that it is not wide-spread. J.W.

75—TARJAN, A. C., 1964. "Two new mucronate-tailed spiral nematodes (*Helicotylenchus*: Hoplolaiminae)." **Nematologica**, 10 (2), 185–191. [German summary p. 191.]

Tarjan describes and figures 2 new species *Helicotylenchus spicaudatus* n.sp. is unique in having a pronounced terminal mucron at the end of the digitate tail, although some specimens lacked a mucron. *H. egyptiensis* n.sp. is also unique in possessing subcuticular refractive dots beneath the inner incisures of the lateral field. The first-named species came from Puerto Rico and the second from Egypt. A key to the species of *Helicotylenchus* is given. J.B.G.

76—THORNE, G., 1964. "Nematodes of Puerto Rico: Belondiroidea new superfamily, Leptonchidae Thorne, 1935, and Belonenchidae new family (Nemata, Adenophorea, Dorylaimida)." **Technical Paper. University of Puerto Rico Agricultural Experiment Station,** No. 39, 51 pp. [Spanish summary p. 50.]

This paper, the first of a series that will cover an extensive collection of nematodes from Puerto Rico, deals with the Belondiroidea n.superf., and the Leptonchidae and Belonenchidae n.fam. of the Dorylaimoidea. The author states that "Belondiroidea constitutes a diverse group of nemas whose principal diagnostic character is the thick sheath of spiral muscles about the basal portion of the esophagus and the narrow, pointed lip region". Belondiroidea now embraces the families Belondiridae (emended), Oxydiridae n.rank, Roqueidae n.fam., Dorylaimellidae n.rank, Nygellidae and Mydonomidae n.fam. Axonchinae n.subf. is erected in Belondiridae. Of the 34 nematode species reported in this paper, only 2 are not new. Of the 18 genera found, 9 are new. The new genera are as follows: *Belondirella* n.g. (type *B. teres* n.sp.) and *Yunqueus* n.g. (type *Y. variatus* n.sp.) in Belondirinae; *Roqueus* n.g. (type *R. gracilis* n.sp.) in Roqueidae; *Mydonomus* n.g. (type *M. spiralis* n.sp.) in Mydonomidae; *Doryschota* n.g. (type *D. apitica* n.sp.) and *Agmodorus* n.g. (type *A. aberrans* n.sp.) in Leptonchinae; *Phellonema* n.g. (type *P. cylindrica* n.sp.) in Tylencholaimellinae of Leptonchidae; *Belonenchus* n.g. (type *B. penetrans* n.sp.) and *Ponconema* n.g. (type *P. striata* n.sp.) in Belonenchidae. The other new species described are: *Belondira porta* n.sp., *B. cylindrica* n.sp., *B. parva* n.sp., *B. tenuidens* n.sp., *B. sacca* n.sp., *Axonchium rotundum* n.sp., *A. baldum* n.sp., *A. amphidium* n.sp., *A. arcuatum* n.sp., *Oxydirus tropicus* n.sp., *O. tenuicaudatus* n.sp., *Dorylalusimel labiatus* n.sp., *D. filicaudatus* n.sp., *D. clavatus* n.sp., *Dorylaimoides intermedius* n.sp., *D. reversus* n.sp., *D. brevidens* n.sp., *D. similis* n.sp., *Tylencholaimellus macrophallus* n.sp., *T. acris* n.sp., *Doryllium flangum* n.sp., *D. nudum* n.sp. and *Tyleptus amalgans* n.sp. *Axonchium amplicolle* and *Leptonchus granulosus* were also found. The possible pathogenicity of those nematode species found around plants of economic importance should be investigated. Collections from El Yunque Tropical Rain Forest indicate that belondirids were dominant and that tylenchids were comparatively rare. Reproduction of all nematodes appeared to be suspended between October 1 and April 1 (i.e. during the island's "winter" months). The plants with which the nematodes were associated and the locality are given for each species. The main diagnostic features of the new forms are included. A.D.B.

77—HEYNS, J., 1965. "On the morphology and taxonomy of the Aporcelaimidae, a new family of dorylaimoid nematodes." *Entomology Mem. Dep. agric. tech. Serv. Repub. S. Afr.*, 10, 51 pp.

Aporcelaimidae n.fam. is erected to accommodate *Sectonema* Thorne, which is removed from the Nygolaimidae, *Aporcelaimus* Thorne, which is removed from the Dorylaimidae and 4 new genera, *Aporcelaimellus* n.g., *Makatinus* n.g., *Aporcelaimoides* n.g. and *Scapidens* n.g. The morphology of the family is discussed and a probable transition from the axial spear of *Aporcelaimus* to the mural tooth of *Sectonema* is illustrated. The distinguishing features of the Aporcelaimid genera are tabulated. *Sectonema* is revised. .....

Aporcelaimoides probulbum n.g., n.sp. from soil around the roots of *Pinus patula* in Transvaal is the type species and differs from all other gene of the Aporcelaimidae in having a dorylaimoid spear which is set ventrally in the pharynx similar in position to the mural tooth of *Sectonema*. *A. probulbum* was also collected from virgin veld, plantations of pine, black wattle and gum trees and orchards of citrus, peach and walnut in widely separated areas of South Africa. *A. californicum* n.sp., one female, from Pine Crest (California, U.S.A.), has a spear which is broad and flared anteriorly with a wide aperture, contrasting with the spear of *A. probulbum* which is relatively slender with an obscure aperture. *Scapidens perplexus* n.g., n.sp. from Spanish Town (Jamaica), is the type species and is distinguished by its mural tooth set on the elevation of the ventral wall of the pharynx. This species was collected also in Turmero and Santa Cruz, Venezuela, but the male is unknown. D.W.L.

78—RÁMON, J. & BADILLO, J., 1965. "Response of sugarcane nematode population to the addition of nematocides in irrigation water." *J. Agric. Univ. P. Rico*, 49 (3), 325–330. [Spanish summary pp. 329–330.]

Nemagon and Fumazone were applied to plots as 0·5 and 1·0 U.S. gal. per acre in irrigation water, at planting and 5 months later, in an attempt to control nematodes and improve the yield of sugar-cane. Nematodes, including *Helicotylenchus*, *Meloidogyne* and *Pratylenchus* were fewer one month after each treatment but subsequently reproduced rapidly. Differences in yield in terms of saccharose, cane or sugar-content between treated and untreated control plots were not significant. D.W.L.

79—ROMÁN, J., 1965. "Nematodes of Puerto Rico, the genus *Helicotylenchus* Steiner, 1945 (Nematoda: Hoplolaiminae)." *Tech. Pap. Univ. P. Rico agric. Exp. Stn*, No. 41, 23 pp. [Spanish summary p. 21.]

A key to the species of the genus *Helicotylenchus* is given and 10 new species from Puerto Rico are described and figured. *H. truncatus* n.sp. from sugar-cane roots resembles *H. cairnsi* but has a shorter stylet and body and phasmids located at the anal level; the tail is curved and truncated. *H. labiatus* n.sp. found about the roots of pineapple differs from *H. broadbalkiensis* in having a shorter stylet and body; the lip region is truncate with 3 or 4 annules and the convex-conoid tail shows fusion of the middle incisures near the terminus. *H. caribensis* n.sp. from about sugar-cane roots, differs from *H. broadbalkiensis* and *H. vulgaris* in having a hemispherical lip region. *H. thornei* n.sp., found in moss on tree trunks, lacks labial striae and has an elongated spiculate terminus. *H. apiculus* n.sp., from forest soil and a sugar-cane field, resembles *H. spicaudatus* in tail shape, but the female tail is shorter, the male is longer and has a longer stylet. *H. curvatus* n.sp., from about sugar-cane roots, resembles *H. insignis* but the outer incisures are not crenate and the stylet and body are shorter. *H. elegans* n.sp. from about sugar-cane roots resembles *H. crenatus*, but the outer incisures are not crenate, the head is not offset and the tail is longer; the phasmids are distinct. *H. tropicus* n.sp. from soil about palm roots has a smaller stylet and fewer lip annules than *H. microlobus* and cupped knobs. *H. flatus* n.sp. from soil around roots of decaying avocados resembles *H. microlobus* in tail shape but lacks a hemizonid and has a smaller stylet. *H. borinquensis* n.sp. from about the roots of sugar-cane differs from *H. microlobus* in being smaller both in body and stylet and in having cupped knobs. S.C.C.

80—CASAMAYOR, R., SEIDEL, D. & DECKER, H., 1966. "Tratamiento con agua caliente contra nemátodos parásitos en plátano." *Boln Cent. Investnes Agropec. Univ. cent. Las Villas, No.* 1, 6 pp. [English summary pp. 5–6.]

Application of water at 55°C. to banana sets in Cuba for 20 min. controlled the spread of *Radopholus similis* and *Helicotylenchus multicinctus* without damaging the plants. The water should be kept at constant temperature and the sets should be less than 13 cm. in diameter. Immersion of sets for 5 min. in 1% Nemagon solution was only effective against *R. similis*; lower concentrations of Nemagon were ineffective. P.S.G.

81—DECKER, H. & CASAMAYOR GARCÍA, R., 1966. "Observaciones sobre la existencia de nemátodos, parásitos de las raíces del plátano, en Cuba." *Boln Ciencs Tecnol. Univ. cent. Las Villas*, 1 (1), 7–32. [German summary p. 25.]

The symptoms of disease associated with *Radopholus similis* and *Helicotylenchus multicinctus* in *Musa* sp. in Cuba, the morphology of the parasites and their life-cycle and development are described and illustrated. Methods of control of these nematodes, which are appearing for the first time on a large scale in Cuba, are reviewed and a list of Cuban host and non-host plants is given. P.S.G.

82—DECKER, H. & CASAMAYOR GARCÍA, R., 1966. "Algunas observaciones sobre la presencia de nemátodos formadores de agallas en las raíces (Meloidogyne spp.) en Cuba." *Boln Ciencs Tecnol. Univ. cent. Las Villas*, 2 (1), 19–29. [English summary p. 29.]

Field trials in Cuba have shown that at least 33 crop plant species are hosts of *Meloidogyne incognita*, 4 (*Capsicum frutescens*, *Daucus carota*, *Psidium guajava* and *Xanthosoma sagittifolia*) of *M. arenaria*, and one (*Zea mays*) of *M. javanica*. Abnormalities of behaviour of *M. incognita* included development of females in *Allium cepa* root without gall formation, and only slight penetration of *Brassica oleracea capitata* so that the nematode was virtually ecto-parasitic. The life cycle of *M. incognita* in the roots of *Lactuca sativa* is outlined. From penetration up to the first egg laying took 19 days (mean temperature of 23·3°C.), and young larvae were active 26 days later. P.S.G.

83—DECKER, H., CASAMAYOR GARCÍA, R. & GANDOY, P., 1966. "Investigaciones sobre la aparición del nemátodo sedentario de las raíces *Rotylenchulus reniformis* en la provincia de Las Villas (Cuba)." *Mems. a Cent. Investnes Agropec. Univ. cent. Las Villas*, Year 1966, pp. 169–175. [English summary p. 174.]

53 plant species from Las Villas province, Cuba, were examined for presence of *Rotylenchulus reniformis*. 24 species were infected; the best hosts being *Solanum melongena*, *Ipomoea batatas*, *Lycopersicon esculentum*, *Cucumis sativus*, *C. melo*, *Vigna sinensis*, *Carica papaya* and *Glycine max*. The 29 species showing no evidence of attack included *Ananas comosus*, *Annona squamosa*, *Capsicum frutescens*, *Citrus limon*, *C. paradisi*, *Cocos nucifera*, *Coffea arabica*, *Musa sapientum*, *Persea americana* and *Psidium guajava*. These differences from the usual pattern of infection are more likely to be due to Cuban environmental factors than to the emergence of a new strain of *R. reniformis*. P.S.G.

84—DECKER, H., CASAMAYOR GARCÍA, R. & SEIDEL, D., 1966. "Investigaciones sobre las plantas hospederas de una población de *Radopholus similis* en Cuba." *Boln Ciencs Tecnol. Univ. cent. Las Villas*, 2 (1), 7–17. [English summary p. 16.]

Trials in Cuba of 37 species of plant grown on soil infested with *Radopholus similis* showed that *Musa* sp. was the most susceptible, followed by *Zea mays*, *Nicotiana tabacum*, *Saccharum officinarum*. *Coffea arabica*, *Hibiscus esculentus* and *Vigna sinensis* were poor hosts and *Brassica oleracea*, *Phaseolus vulgaris*, *Gossypium hirsutum*, *Sesamum indicum* were resistant. P.S.G.

85—DÍAZ-SILVEIRA, M. F., 1966. "Los nemátodes, parásitos de las plantas y su importancia económica en Cuba." *Agrotéc. Cuba*, 4 (2), 43–47.

86—EDMUNDS, J. E. & FARRELL, K. M., 1966. "*Tylenchulus semipenetrans* in Trinidad." *Pl. Dis. Reptr*, 50 (7), 478.

Tylenchulus semipenetrans was recorded in Trinidad for the first time and was responsible for those die-back symptoms of "Marsh" white grapefruit normally characteristic of drought and malnutrition. D.W.L.

87—SCHIEBER, E., 1966. "Nemátodos que atacan al café en Guatemala, su distribución, sintomatología y control." *Turrialba*, 16, 130–135.

Coffea robusta is highly resistant to *Pratylenchus coffeae* and *Meloidogyne exigua* in Guatemala. [From *Pl. Breed. Abstr.*, 37, No. 1166.] J.E.P.

88—THAMES, Jr., W. H., 1966. "A soil-borne *Desmoscolex* from Guatemala." [Abstract.] *Nematologica*, 12 (1), 100.

89—GOLDEN, A. M. & MURPHY, D. G., 1967. "Encholaimoidea (Nematoda: Dorylaimida), a new superfamily representing dorylaimid specimens with cephalic setae." *Proc. helminth. Soc. Wash.*, 34 (1), 94–98.

Encholaimus taurus n.g., n.sp. from soil around the roots of *Cocos nucifera* at Golden Grove, Trinidad, has a cylindroid body tapering at both ends.

The head has 6 large horn-like and 4 smaller setae in an outer circle and 6 labial or peri-oral papillae in an inner circle. The setae are the distinguishing features of Encholaimoidea n.superf. The spear has swollen extensions, bearing knobs or flanges. The cuticle is heavily annulated, with longitudinal striae forming a plate-like pattern. The cuticular pattern and the cephalic setae are characteristic of Encholaimidae n.fam. Lateral pores are absent. There is one ovary and the vulva is a transverse slit. The spicules are paired and dorylaimoid in shape. The order Dorylaimida is emended to include the new taxa. D.W.L.

90—KRAAIJENGA, D. A. & OUDEN, H. DEN, 1966. "'Red ring' disease in Surinam." *Neth. J. Pl. Path.*, 72 (1), 20–27. [Dutch summary pp. 26–27.]

In Surinam, red ring disease in coconut caused by *Rhadinaphelenchus cocophilus* could not be found under natural conditions although "little leaf" symptoms indicated the presence of the nematode [see Helm. Abs., 32, No. 1478]. The weevil vector *Rhynchophorus palmarum* was collected from coconut and oil palm plantations and was contaminated with the nematode. Red ring symptoms were induced in coconut by sealing "little leaf" leaves into holes drilled in the bole and in oil palm by removing dead leaf axils and cortex giving access to the vector, but they developed slowly. *Rhadinaphelenchus cocophilus* is sensitive to drought and it is suggested that dry periods twice a year prevent the effective contamination of the vector. D.W.L.

91—AYALA, A., ROMÁN, J. & GONZÁLEZ TEJERA, E., 1967. "Pangola grass as a rotation crop for pineapple nematode control." *J. agric. Univ. P. Rico*, 51 (1), 94–96.

In the control of pineapple nematodes in Puerto Rico, greater yields of pineapple were achieved when the crop was rotated with Pangola-grass (*Digitaria decumbens*) than when it was treated with D-D or left untreated. *Digitaria* showed complete resistance to *Meloidogyne incognita*, *Criconemoides* and *Helicotylenchus* and partial resistance to *Rotylenchulus reniformis*. Control was apparently due to the secretion of both a hatching factor and a toxin by *D. decumbens*. M.R.N.S.

92—CASAMAYOR, R., SEIDEL, D. & DECKER, H., 1967. "Tratamiento con agua caliente contra nemátodos parásitos en plátano." *Beitr. trop. subtrop. Landw. TropenvetMed.*, 5 (1), 41–48. [English, French, German & Russian summaries pp. 46–47.]

As a means of controlling the spread of *Radopholus similis* and *Helicotylenchus multicinctus* in banana rhizomes in Cuba, the application of hot water at 55°C. for a period of 20 min. proved effective. Satisfactory results in controlling *R. similis* have also been achieved by applying 1% Nemagon for 5 min. but this did not check *H. multicinctus*. The use of lower concentrations was not effective. The application of hot water did not retard the early growth of varieties such as Criollo, Enano, Johnson, Tres Cuartos and Burro. [A.S.] S.W.A.

93—DALMASSO, A., 1967. "Description du mâle de *Longidorus laevicapitatus* Williams, J. R., 1959, Nematoda Dorylaimina, parasite de la canne à sucre aux Antilles." *Annls Épiphyt.*, 18 (3), 313–316. [English summary p. 315.]

The male of *Longidorus laevicapitatus*, which is described for the first time, was found in soil around the roots of sugar-cane in Guadeloupe, French West Indies, which is probably a new record for this part of the world. It resembles other species in the genus in most characters but the system comprising the gubernaculum and lateral pieces was not observed, and the copulatory and transverse muscles are also different from species of *Longidorus* and *Xiphinema*. This nematode was found in such large numbers that it must constitute a serious threat to sugar-cane. L.E-L./S.W.A.

94—DECKER, H., CASAMAYOR, GARCÍA R. & BOSCH, D., 1967. "Observaciones sobre la presencia del nemátodo *Scutellonema bradys* en el tuberculo del ñame, en la provincia de Oriente (Cuba)." *Boln Cienc Tecnol. Univ. cent. Las Villas*, 2 (3), 67–70. [English summary p. 70.]

The first occurrence of *Scutellonema bradys* in Cuba is reported. The nematode was found in large numbers in the dried and shrivelled tubers of *Dioscorea alata* from Oriente province. The nematode is described and figured and the symptoms of the disease and methods of control reported. P.S.G.

95—GRISSE, A. DE, 1967. "Description of fourteen new species of Criconematidae with remarks on different species of this family." *Biol. Jaarb.*, 35, 66–125. [French summary pp. 87–88.]

14 new species of Criconematidae are described and figured: one *Criconemoides* sp., 4 *Macroposthonia* spp., 4 *Nothocriconema* spp., 4 *Discocriconemella* spp. and one *Lobocriconema* sp. *C. amorphus* n.sp. was collected from a dune at Middelkerke, Belgium; *M. coomansi* n.sp. from around the roots of *Chloris gayana* from Salines, Congo Republic [=Congo Kinshasa]; *M. denoudeni* n.sp. from sandy soil around the roots of citrus and from clay soil around the roots of coffee from Paramaribo, Surinam; *M. dhercei* n.sp. from around the roots of old peach-trees and grass from Rijkstuinbouwschool, Melle, Belgium; *M. peruensiformis* n.sp. from around the roots of potato from Santo Domingo, Venezuela; *N. corbetti* n.sp. from around the roots of *Fimbristylis* sp. from Zomba, Malawi; *N. dubium* n.sp. from around the roots of tea plants in Musasa and banana in Mwindozi, Burundi; *N. loofi* n.sp. from sandy dune soil around the roots of grass plants from Middelkerke, Belgium; *N. solitarium* n.sp. from a bamboo forest near Pweto, Congo Republic; *D. baforti* n.sp. and *D. macramphidia* n.sp. from a forest along the Kinga river, Kamena, Congo Republic; *D. glabrannulata* n.sp. from savanna at Kamena, Congo Republic; *D. sphaerocephaloides* n.sp. from around the roots of sugar-cane from central Nyanza, Kenya; *L. pauperum* n.sp. from grass roots from Kansimba, Congo Republic. 34 formerly described *Criconemoides* species are synonyms and 20 are *species inquirendae*. A key is given for the 10 genera of Criconematidae and the species are described and illustrated. S.W.A.

96—JAMAICA, 1967. "Annual report of the Ministry of Agriculture and Lands for 1962." *Kingston: Government Printer*, 102 pp. [Plant nematodes pp. 53, 56, 59.]

200 acres of tobacco lands were treated with D-D to control nematodes. Problems associated with *Radopholus similis* in banana were studied by checking clean seed nurseries, treating suckers before planting, incriminating alternative hosts, e.g. *Brachycarpa* (wild banana) and testing resistance to the nematode in new varieties. A general survey into the nematodes of important crops continues. J.E.P.

97—KRILOV, P. S., 1967. [Nematode diseases of sugar-cane in Cuba.] *Trudy gel'mint. Lab.*, 18, 56–58. [In Russian.]

98—ROMÁN, J., 1967. "Preliminary investigations on the nematodes associated with sugar-cane in Puerto Rico." *Congr. int. Soc. Sug. cane Technol.* (12*th*), *Puerto Rico*, 1965. Proceedings, pp. 1401–1407.

Studies on *Meloidogyne* spp. on sugar-cane in Puerto Rico are reported. Preliminary results with D-D were promising. [From *Hort. Abstr.*, 39, No. 5967.]

99—STOYANOV, D., 1967. "Especies de nematodos parásitos del plátano en Cuba y posibilidades de control." *Revta Agric., Cuba*, 1 (3), 9–47. [English summary.]

The occurrence of nematodes in Cuban banana plantations was studied. *Helicotylenchus multicinctus* is widely spread and almost always associated with *Rotylenchulus reniformis*, *Radopholus similis* and *Meloidogyne incognita*. *Pratylenchus coffeae* has a more limited distribution. Except *P. coffeae*, all the species produce different root necrosis symptoms which are described. *H. multicinctus*, *Rotylenchulus reniformis* and *M. incognita* can be found in the soil down to 45 cm. without a host plant and remain infective for longer than 4 months. These 3 species affected 36, 55 and 61 cultivated and wild plant species, respectively, out of 78 species tested. [From *Hort. Abstr.*, 39, No. 5686.]

100—STOYANOV, D., 1967. "Additions to host records of *Meloidogyne* sp., *Helicotylenchus multicinctus* and *Rotylenchulus reniformis*." *Nematologica*, 13 (1), 173.

New host records, all from Cuba, are listed for *Meloidogyne* sp., *Helicotylenchus multicinctus* and *Rotylenchulus reniformis*. J.E.P.

101—TARJAN, A. C., 1967. "Some plant nematode genera associated with citrus and other crops in Costa Rica and Panama." *Turrialba*, 17 (3), 280–283. [Spanish summary p. 280.]

A survey of plant nematodes in the region around San José, Costa Rica, and Panama City, Panama, showed that *Helicotylenchus* spp., followed by *Tylenchus* spp. and *Xiphinema* spp. were common in root and soil samples from citrus and other crops. *Longidorus laevicapitatus* was the only species identified from this widely distributed genus. *Tylenchulus semipenetrans* was not found in Panama, presumably because of the limited number of citrus samples obtained. *Trophurus longimarginatus*, previously reported only from Puerto Rico, was discovered in Panama. [A.S.] S.W.A.

102—THORNE, G., 1967. "Nematodes of Puerto Rico: Actinolaimoidea new superfamily with a revision of its genera and species with addenda to Belondiroidea (Nemata, Adenophorea, Dorylaimida)." *Tech. Pap. Univ. P. Rico agric. Exp. Stn*, No. 43, 48 pp.

This paper continues the taxonomic survey of the nematodes of Puerto Rico [*Helminth. Abstr.*, 34, No. 2236]. Actinolaimoidea n.superf. is erected to include Actinolaimidae, Neoactinolaimidae n.fam., Paractinolaimidae n.fam., Trachypleurosidae n.fam., Mylodiscidae n.fam. and Carcharolaimidae n.fam. The last named consists of Carcharolaiminae n.subf. and Caribenemamtinae n.subf. Brittonematinae n.subf. is erected within the Actinolaimidae and includes *Brittonema* n.g. and *Actinocephalus* n.g. *Brittonema taylori* n.comb. is erected for *Actinolaimus taylori* and *B. tenuiaculeatus* n.comb. for *A. tenuiaculeatus*. The following are described: *B. sulcatum* n.sp.; *B. fusiformum* n.sp.; *B. spicatum* n.sp.; *Actinocephalus bizarrus* n.sp.; *Neoactinolaimus agilis* n.g., n.sp.; *Egtitus bryophilus* n.g., n.sp.; *Paractinolaimus vigor* n.sp.; *P. baldus* n.sp.; *P. robustus* n.sp.; *Westindicus brachycephalus* n.g., n.sp.; *Carcharolaimus ramirezi* n.sp.; *C. discus* n.sp.; *C. aberrans* n.sp.; *Carcharoides tigrodon* n.g., n.sp.; *Caribenema ferox* n.g., n.sp.; *C. longidens* n.sp.; *Nannomermis infestans* n.sp. The species of *Actinolaimus* are listed, giving their present taxonomic position and diagnostic characters. An addendum to the Belondiroidea (described in the previous paper of this series) is included, giving a description of *Axonchoides crassus* n.g., n.sp. from moss and soil by a stream in the El Yunque Mountains. M.R.N.S.

103—AYALA, A., 1968. "Nematode problems of pineapple in Puerto Rico." In: Smart, Jr., G. C. & Perry, V. G. [Editors], "Tropical nematology." *Gainesville: University of Florida Press*, pp. 49–60. [Spanish summary pp. xix–xx.]

Rotylenchulus reniformis, *Helicotylenchus* sp. and *Meloidogyne incognita* are considered to cause the greatest crop losses of pineapple in Puerto Rico. Split dosage applications of fumigants are recommended to control nematodes in the top soil layers as well as those deeper down. In a comparison of 9 nematicides, D-D and Vidden D gave the greatest increases in yield. Crop rotations with pangola grass or sugar-cane are recommended as control measures but more needs to be known of the economics of these treatments. J.B.

104—AYALA, A., ROMÁN, J. & GANDÍA, H., 1963. "Effect of soil fumigation used in the control of pineapple nematodes in Puerto Rico." *J. Agric. Univ. P. Rico*, 47 (2), 76–90. [Spanish summary pp. 88–89.]

105—BLAIR, G. P. & DARLING, H. M., 1968. "Red ring disease of the coconut palm, inoculation studies and histopathology." *Nematologica*, 14 (3), 395–403. [German summary p. 402.]

Coconut, *Cocos nucifera*, and cabbage palm trees, *Roystonea oleracea*, aged approximately 4 to 7 years developed red ring disease and died following inoculation with *Rhadinaphelenchus cocophilus* through wounds in their stems and roots [in Trinidad]. When roots of 12-year-old coconut trees were inoculated with *R. cocophilus*, they became infested and decayed but trees did not die from the disease. *R. cocophilus* incited red ring disease in both coconut and cabbage palms 3 to 7 years old when inoculum was placed on roots which were not artificially damaged. *R. cocophilus* also incited red ring in the coconut palm but not in the cabbage palm when inoculum was placed in their leaf axils. *R. cocophilus* occurred mostly in discoloured ground parenchyma tissue and in smaller numbers in the adjacent white parenchyma.

Nematodes were present only intercellularly in the upper part of the stem where lesions were discrete, but in the discoloured zone they were also present intracellularly and parenchyma tissue was damaged. A few cells in such areas were completely destroyed, forming microscopic cavities which were teeming with *R. cocophilus*. Though the nematode was not found in the vascular tissue, xylem vessels in the discoloured area were found to be occluded with tyloses. *R. cocophilus* appeared to enter coconut trees through cracks in the stem near leaf bases. Suggested approaches to control are to seal such cracks mechanically or to place a granular preparation of a nematicide in leaf axils. [A.S.] P.S.G.

106—BRITAIN, 1968. "Commonwealth Development Corporation, Annual report and statement of accounts, 1967." *London: Commonwealth Development Corporation*, v + 125 pp. [Plant nematodes p. 42.]

Nematodes predisposed bananas to wind damage and also decreased yields on the Melville Hall Estate, Dominica. J.E.P.

107—CAMPOS VELA, VI, A., 1968. "Taxonomy, life cycle and host range of *Heterodera mexicana* n.sp. (Nematoda Heteroderidae)." *Diss. Abstr.*, 28 (11), 4375.

Heterodera mexicana n.sp. was found parasitizing *Solanum rostratum* in Mexico. Under glasshouse conditions it reproduced on *S. rostratum*, *S. carolinensis* and tomato. S.W.

108—EDMUNDS, J. E., 1968. "Nematodes associated with bananas in the Windward Islands." *Trop. Agric., Trin.*, 45 (2), 119–124.

Investigations were carried out at the Windward Islands Banana Research Laboratory to assess the nematode problem in the Islands and to seek effective practical and economic control of the nematode pathogens. *Radopholus similis*, *Helicotylenchus multicinctus* and *Rotylenchulus* sp. were found in greatest numbers in the Islands. The feeder-root system of banana was found to support a much greater nematode population than the primary roots, thus suggesting the importance of nematodes in contributing to the severe rotting of the feeder roots and the subsequent effect on water and nutrient uptake. Further work on the pathogenic role of *Rotylenchulus* sp. is stressed. M.M.H.

109—FENWICK, D. W., 1968. "The effect of weevil control on the incidence of red ring disease." *Port-of-Spain: Agricultural Society of Trinidad and Tobago*, 15 pp.

Monthly additions of Endrin and Agrocide to the leaf axils of coconut trees were found to reduce the incidence of red ring disease by controlling *Rhynchophorus palmarum* and so preventing the spread of *Rhadinaphelenchus cocophilus*. J.B.

110—HOYLE, J. C., 1968. "A simple method for poisoning coconut trees." *J. agric. Soc. Trin.*, 68 (4), 459–465.

10 chemicals were tested to ascertain their effectiveness in killing coconut palms infected with *Rhadinaphelenchus cocophilus*. 7 had no effect on the palm since the disease limits the movement of fluids in the stem. Of the remaining 3 chemicals, Konesta (TCA) killed palms within 8 weeks, Daconate (MSMA) killed them within 4 weeks and Silvisar (cacodylic acid) killed them within 2 weeks. Both Daconate and Silvisar prevented the breeding of weevils in poisoned palms but neither had any effect on the nematode population. Silvisar is recommended and the technique for poisoning coconut palms is described. [From *Hort. Abstr.*, 39, No. 7526.]

111—KHAN, S. H. & ZAKIUDDIN, 1968. "A new species of the genus *Peltamigratus* Sher, 1963 (Nematoda: Hoplolaiminae) from Trinidad, West Indies." *Annls Zool. Écol. anim.*, 1 (4), 495–498. [French summary p. 498.]

Peltamigratus browni n.sp. was collected from soil around roots of *Ananas sativus* in Trinidad, West Indies. It is closest to *P. holdemani* and *P. pachyurus* but differs from the former in having a smaller stylet, more anteriorly located dorsal oesophageal gland opening and more posterior excretory pore: the females are smaller with outer incisures fading out in front of the tail, and terminal tail annules enlarged. It differs from *P. pachyurus* in having the hemizonid behind the excretory pore, a single epiptygma and differently shaped tail with annulation round the tip. M.T.F.

112—LIPES, J. E., 1968. "Discovery of golden nematode." *Pl. Prot. Bull. F.A.O.*, 16, (1) 12–13.

113—LOOF, P. A. A. & JAIRAJPURI, M. S., 1968. "Taxonomic studies on the genus *Tylencholaimus* de Man, 1876 (Dorylaimoidea) with a key to the species." *Nematologica*, 14 (3), 317–350. [German summary p. 349.]

The genus *Tylencholaimus* is removed from the Dorylaimidae and placed in the Leptonchidae. Consequently the subfamily Tylencholaiminae is also transferred to Leptonchidae; it is considered synonymous with Xiphinemellinae and contains the genera *Tylencholaimus*, *Botalium*, *Discomyctus*, *Xenonchium* and *Xiphinemella*. The genus *Enchodelus* remains in the Dorylaimidae. *T. mirabilis*, the type species of *Tylencholaimus*, is redescribed from topotypes; *T. brevicaudatus* is considered identical with it. A neotype is designated and the male, unknown so far, is described. 8 new species are described and figured. *T. parilus* n.sp. associated with *Anacardium occidentale* at Waltair, Visakhapatanam, India, has the same lip-shape as *T. minimus* but is much smaller and there are no radial striae in the cuticle. *T. congestus* n.sp. from vineyard soil at Ischia, Italy, and *T. savaryi* n.sp. from soil at Vaux-sur-Morges, Switzerland, are characterized by didelphic gonads and by a number of large cells surrounding the vagina; in *T. congestus* the lip region is offset by a shallow constriction, the inner papillae do not project and the tail is hemispheroid; in *T. savaryi* the lips are offset by a deep constriction, the inner papillae project markedly and the tail is convex-conoid. *T. crassus* n.sp. from soil from a beet field at Middenmeer, The Netherlands, is also didelphic, but much stouter than *T. congestus* and *T. savaryi*, and there are no large cells around the vagina. *T. formosus* n.sp. associated with *Erodium cicutarium* at Terschelling, The Netherlands, and *T. airolensis* n.sp. from soil at Airolo, St. Gotthard, Switzerland, are prodelphic, the rudiment of the posterior gonad is large and serves as receptaculum seminis; in *T. formosus* the oesophagus is expanded behind the middle, the 2 parts being separated by a marked constriction; in *T. airolensis* the 2 parts of the oesophagus are equal in length and not separated by a constriction. In *T. maritus* n.sp. associated with *Espeletia* sp. at Mucabaji, Venezuela, the rudiment of the posterior female gonad is very small, the tail is hemispheroid and males are numerous. *T. paradoxus* n.sp. from the same source as *T. savaryi* has a very fine spear and minute sclerotized pieces near the oral opening. In addition, a redescription is given of *T. stecki*. *T. similis* is synonymized with *T. leptonchoides*; *T. macrurus* may also be identical with this species. A few additional details of *T. viduus* are given. A key to the species is presented. [A.S.] P.S.G.

114—ROMÁN, J., 1968. "Nematode problems of sugarcane in Puerto Rico." In: Smart, Jr., G. C. & Perry, V. G. [Editors], "Tropical nematology." *Gainesville: University of Florida Press*, pp. 61–67. [Spanish summary pp. xx–xxi.]

Meloidogyne spp., *Helicotylenchus* spp., *Tylenchorhynchus* spp., *Pratylenchus* spp., *Criconemoides* spp., *Hemicriconemoides* spp., *Belonolaimus lineatus*, *Hemicycliophora*, *Criconema*, *Paratylenchus*, *Hoplolaimus*, *Trophurus*, *Ditylenchus*, *Longidorus*, *Trichodorus* and *Xiphinema* were the nematodes most commonly found associated with sugar-cane in Puerto Rico. Tests on control and crop responses to treatment were carried out on *Meloidogyne* spp. and *Helicotylenchus* spp. with Nemagon and Fumazone, and on *B. lineatus* with D-D. J.B.

115—SCHIEBER, E., 1968. "Nematode problems of coffee." In: Smart, Jr., G. C. & Perry, V. G. [Editors], "Tropical nematology." *Gainesville: University of Florida Press*, pp. 81–92. [Spanish summary p. xxii.]

The nematodes parasitic on coffee and the symptomatology of the diseases they cause in Central America are reviewed. The use of D-D, the plant inspection system, and the stopping of seedling importation are recommended to control nematodes in nurseries. In established plantations, recommended control measures are the removal and burning of infected trees, the planting of only healthy seedlings, and the use of N and P fertilizers. The search for resistant varieties is reviewed. J.B.

116—TABOADA, J.; CABALLERO D., J., 1968. [Research on the chemical control of *Radopholus similis* (Cobb, 1893) Thorne, 1949 on banana plants.] "Investigaciones sobre el control químico de *Radopholus similis* (Cobb, 1893) Thorne, 1949, en plátano." *An. Inst. Biol. Univ. Méx. Ser. Zool.*, 39 (1), 29–33.

In 1966 *Radopholus similis* was reported in Mexico for the first time. Effective control in banana plantations in Chiapas State was achieved by annual application of 8 to 11 ml. Thimet (phorate) I.C-8 per mat. Rhizomes from infested banana plants were completely freed of *R. similis* by immersion for 15 to 30 min. in an aqueous solution of 50 p.p.m. (v/v) of Bay 68138 (40% effective concentration). Ordinary irrigation water was used. P.S.G.

117—TARTÉ, R., 1968. "First record of the occurrence of *Heterodera rostochiensis* in Panama." *Pl. Dis. Reptr.*, 52 (8), 587–588.

The first recorded occurrence of *Heterodera rostochiensis* in the potato growing Cerro Punta region of Panama is reported. The infection may have originated in seed potatoes imported from Holland or may be indigenous. There are slight morphological differences between the nematodes from Holland and Panama but these are probably due to environmental variability. J.B.

118—TELIZ, D. & GOHEEN, A. C., 1968. "Diseases of grapevines in Mexico." *Pl. Dis. Reptr*, 52 (5), 372–373.

In a survey of grapevine diseases in Mexico, *Criconemoides xenoplax*, *Pratylenchus vulnus*, *Meloidogyne* spp. and *Xiphinema americanum* were found. Fanleaf virus was also found but not its vector *X. index*. J.B.

119—TORREALBA, P. A., 1968. "Taxonomic and biological observations on some nematode genera." *Diss. Abstr.*, 28 (8), 3132.

120—VERMEULEN, H., 1968. "Investigations into the cause of the phloem necrosis disease of *Coffea liberica* in Surinam, South America." *Neth. J. Pl. Path.*, 74 (6), 202–218. [Dutch summary pp. 216–217.]

No nematodes were found to act as vectors of phloem necrosis disease in *Coffea liberica* in Surinam, South America. J.B.

120a See addendum

—BARNES, R. F. & GOWEN, S. R., 1969. "Root-knot nematodes in Trinidad." In: Peachey, J. E. [Editor], "Nematodes of tropical crops." *Tech. Commun. Commonw. Bur. Helminth.*, No. 40, pp. 155–161.

Lists are given of weed and crop hosts of *Meloidogyne* sp., *M. incognita*, *M. javanica* and *M. exigua* from which the authors have isolated egg masses in Trinidad. The nematodes are widespread in the island and cause considerable crop losses. Soil fumigation may be economically feasible as a control measure in tobacco and other cash crops. Useful resistance to *Meloidogyne* may be found in pigeon pea and ground nut. J.E.P.

121a See addendum

122—BARRIGÁ, R., 1969. "Control quimico de nematodos en suelos cultivados con tabaco (*Nicotiana tabacum* L.) en el Valle del Cauca, Colombia." *Proc. Soil Crop Sci. Soc. Fla*, Year 1968, 28, 254–257. [English summary p. 257.]

Experiments were carried out with the nematicides Dowfume W85 [EDB], Telone [1,3-dichloropropene],Dorlone and Vapam [metam-sodium] for control of plant-parasitic nematodes, mainly *Meloidogyne*, on tobacco in the Cauca valley, Colombia. Dowfume W85 at 26·5 gal. per hectare and Telone at 55·5 gal. per hectare gave good control for the first 30 days after the plants were transplanted but at harvest, 85 days later, populations of root-knot nematode larvae had built up to nearly half those in control plots. Dorlone at 32·2 gal. per hectare and Vapam at 27·2 gal. per hectare were less effective. These results and the high cost of the nematicides militate against their use for control of nematodes in tobacco in Colombia. M.T.F.

123—BISESSAR, S., 1969. "Plant parasitic nematodes of crops in Guyana." *Pest Artic. News Summs*, 15 (1), 74–77.

Nematodes found on tomato, banana, *Piper nigrum*, coffee, *Zingiber officinale*, tobacco, *Hibiscus cannabinus*, rice, sugar cane and *Carica papaya* in Guyana, are listed. This is the first extensive survey of nematodes in Guyana. J.B.

124—EDMUNDS, J. E., 1969. "Plant nematode problems of the Windward Islands." In: Peachey, J. E. [Editor], "Nematodes of tropical crops." *Tech. Commun. Commonw. Bur. Helminth.*, No. 40, pp. 142–148.

Most of the major export crops of the Windward Islands are seriously attacked by plant nematodes. *Radopholus similis*, *Helicotylenchus multicinctus* and possibly *Rotylenchulus* sp. drastically reduce banana production. *Rhadinaphelenchus cocophilus* has reached as far north as St Vincent and threatens to wipe out the coconut industry in some areas. *Tylenchulus semipenetrans* was recently reported in Dominica and appears to be widespread in that island. *Meloidogyne* sp. is the major nematode pathogen of vegetables in all the islands. The role of *H. pseudorobustus* in a disease of arrowroot in St. Vincent is being investigated. Systematic research, the application of control measures and the development of quarantine procedures are necessary. J.E.P.

125—FENWICK, D. W., 1969. "The present outlook on red ring control." *J. agric. Soc. Trin.*, 69 (4), 969–979.

The 'cut and burn' policy for phytosanitation in red-ring disease of coconut is now in question due to the spreading of the disease by infected chippings [see *Helminth. Abstr., Ser. B*, 39, No. 336]. Silvisar has replaced Weedicide as a poison for infected trees, due to its lower mammalian toxicity and greater ease of application. More direct control of both the nematode and its weevil vector has been achieved in experimental trials in Trinidad using Cocosev, a locally produced formulation of ground coconut shells coated with Sevin [carbaryl]. A reasonable measure of control is reported for the first year with Cocosev being applied every 2 months to the leaf axils of susceptible trees. Clogging of leaf axils with spent chemical reduced control in subsequent years. The low mammalian toxicity of Sevin is of value. Details of methods for screening systemic nematicides are given, but the difficulties of assessing contamination of the copra hinders research in this field. P.S.G.

126—FLORES, J. M. & YÉPEZ T., G., 1969. "*Meloidogyne* in coffee in Venezuela." In: Peachey, J. E. [Editor], "Nematodes of tropical crops." *Tech. Commun. Commonw. Bur. Helminth.*, No. 40, pp. 251–256.

Plant nematodes, especially *Meloidogyne exigua* are widely distributed in all the coffee-producing zones of Venezuela. *Pratylenchus coffeae* was found only in the Andean and Central Region. Other nematodes found included *Helicotylenchus erythrinae*, *Helicotylenchus* sp., *Criconemoides* sp., *Aphelenchus avenae* and *Aphelenchoides* sp. The nematodes are less numerous from January to March, probably because of the dry conditions, and reach high levels from May to October. J.E.P.

126a See addendum

127—JONES, E. M., 1969. "Control of the root-knot nematode in lettuce." In: Peachey, J. E. [Editor], "Nematodes of tropical crops." *Tech. Commun. Commonw. Bur. Helminth.*, No. 40, pp. 162–163.

Methyl bromide and various formulations of DBCP were tried against *Meloidogyne* in boxes before planting with lettuce in Trinidad. Methyl bromide was best but further investigations are required on dosage rates and time of application of DBCP for local conditions. J.E.P.

128—KNOBLOCH, N. A., 1969. "*Peltamigratus thornei* sp.n. (Nematoda: Hoplolaimidae) from soil in Central America." *Proc. helminth. Soc. Wash.*, 36 (2), 208–210.

Peltamigratus thornei n.sp. is described from soil around the roots of *Cocos nucifera* in British Honduras. It is close to *P. luci* but differentiated by the rounded spear knobs, longer spear, an obscure hemizonid anterior to the excretory pore, no spermatheca and a rounded tail terminus. A key to the species of *Peltamigratus* is given. J.B.

129—MAAS, P. W. T., 1969. "Two important cases of nematode infestation in Surinam." In: Peachey, J. E. [Editor], "Nematodes of tropical crops." *Tech. Commun. Commonw. Bur. Helminth.*, No. 40, pp. 149–154.

Radopholus similis and *Helicotylenchus multicinctus* on banana in Surinam were controlled by flood fallowing and subsequent replanting. Coconut and oil palm with little leaf and red ring were also studied. *Rhadinaphelenchus cocophilus* was inoculated into oil palms and the seasonal degree of contamination of *Rhynchophorus palmarum* with the nematode was evaluated. J.E.P.

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—MILLER, C. R., 1969. "Tobacco diseases in Venezuela, Costa Rica and Nicaragua." *Pl. Dis. Reptr*, 53 (10), 823–824.

this survey, *Meloidogyne* is reported on tobacco Venezuela. No nematodes are reported as using diseases of tobacco in Costa Rica or caragua. J.B.

131—NAVARRO A., R., 1969. "Rotacion de cultivos para el control de nemátodos fitoparasiticos en el Valle del Cauca." *Proc. Soil Crop Sci. Soc. Fla*, Year 1968, 28, 276–279. [English summary p. 279.]

Tomato and beans (*Phaseolus vulgaris*) are attacked y several nematode species in the Cauca Valley, Colombia. When *Crotalaria spectabilis* and *Tagetes minuta* were used in the crop rotation, the nematode opulations were much reduced. A positive correlaion was observed between the rate of increase in umbers of nematodes and the vegetative stage of he plant. [From English summary.] M.T.F.

32—RAMIREZ A., H. & BARRIGÁ O., R., 1969. "Nematodos asociados con el cultivo de la papa en Colombia." *Proc. Soil Crop Sci. Soc. Fla*, Year 1968, 28, 286–292. [From English summary p. 292.]

n a survey of 238 farms in the 4 principal potatorowing districts of Colombia, 11 nematode genera ere recorded plus one group of several genera esignated "spirals". *Meloidogyne* and *Pratylenchus* ere found in 32 samples each, *Tylenchulus* in 29, *otylenchulus* in 18, *Trichodorus* in 17, *Xiphinema* 16, *Heterodera* in 13, *Ditylenchus* in 11 and *phelenchoides*, *Criconemoides* and *Tylenchorhynchus* 5, 2 and 1 respectively. "Spirals" were recorded 137 samples. Greatest numbers of specimens per mple of 200 c.c. were *Rotylenchulus* (30), *Pratynchus* (25), "spirals" (24), *Meloidogyne* (20) and *richodorus* (14). Potato yields were greatly reuced by *Meloidogyne*. Largest nematode populions were found in the Antioquia region, 2,200 to ,500 m. in altitude, and none were recorded from rms above 3,000 m. M.T.F.

33—SCHIEBER, E. & GRULLON, L., 1969. "El problema de nemátodos que atacan al café (*Coffea arabica*) en la República Dominicana." *Turrialba*, 19 (4), 513–517. [English summary p. 513.]

Nematodes are an important problem in coffee roduction in the Dominican Republic. A complete urvey of coffee growing areas revealed *Pratylenchus offeae* causing root lesions and *Meloidogyne exigua* ausing root galls. It is suggested that *Coffea anephora* var. Robusta be used as a source of esistance for the stock in grafted plants coupled ith the use of fertilizers and nursery plants instead f self-sets to combine resistance with quality. From English summary.] M.T.F.

34—SCOTTO LA MASSÈSE, C., 1969. "The principal plant nematodes of crops in the French West Indies." In: Peachey, J. E. [Editor], "Nematodes of tropical crops." *Tech. Commun. Commonw. Bur. Helminth.*, No. 40, pp. 164–183.

n 1967, 82 samples were taken from the main crops f the French West Indies in order to discover the ematodes which could cause losses in yield. Surveys in virgin soil made it possible to differentiate etween the autochthonous and introduced species, nd to study the changes in nematode fauna following the planting of crops. The main plant nematodes ound on the crops examined were *Trophurus* spp., *Meloidogyne exigua* on citrus, *Helicotylenchus* spp., *Pratylenchus* spp., *Radopholus similis* on banana, *Rotylenchulus reniformis*, *Tylenchulus semipenetrans* n citrus, *Longidorus laevicapitatus* on sugar cane and *Xiphinema vulgare* on coconut. Seasonal fluctuations n numbers of nematodes on certain crops were also etermined. Some of the banana plantations were till free of *Radopholus similis* and consequently it is ery important to prevent its spread. J.E.P.

135 SURINAM, LANDBOUWPROEFSTATION SURINAME. [Annual report for 1969 of the Agricultural Experiment Station of Surinam.] Jaarverslag 1969. Paramaribo. (1971) 168 pp. [Nl, en] From *Horticultural Abstracts 42*, 8414.

[Including nematode control on banana.].

136—SURINAM, 1969. [Surinam Agricultural Research Station. Annual report 1968.] "Landbouwproefstation Suriname. Jaarverslag 1968." *Meded. LandbProefstn Suriname*, No. 44, 156 pp. [Plant nematodes pp. 139–153.]

Infestation of bananas with *Radopholus similis* and *Helicotylenchus* spp. increased between 1964 and 1968. In land planted after flooding, nematode numbers were at first fewer and yields of fruit greater. When *Rhadinaphelenchus cocophilus* was inoculated into the palms *Mauritia flexuosa* and *Maximiliana maripa*, red ring symptoms developed, but these palms have not been found infested in the wild. When pieces of stem tissue of these palms, coconut palm and oil palm were inoculated, the nematodes colonized them. M.T.F.

137—TORREALBA, P. A., 1969. "Survey of plant-parasitic and free-living nematode genera from Venezuela." In: Peachey, J. E. [Editor], "Nematodes of tropical crops." *Tech. Commun. Commonw. Bur. Helminth.*, No. 40, pp. 257-263.

A total of 76 genera, including plant parasitic and free living forms, were identified in a survey of nematodes from Venezuela. *Helicotylenchus* was the most common nematode and was associated with the largest number of plant species. *Rhadinaphelenchus*, *Meloidogyne*, *Tylenchulus* and *Ditylenchus* were found to cause the most damage to crops. Cysts of *Heterodera* were found in only 2% of the samples. *Pseudhalenchus*, *Neotylenchus*, *Bastiania*, *Cryptonchus*, *Meylonema*, *Trachypleurosum*, *Nygellus*, *Roqueus*, *Sporonchulus* and *Cobbonchus* are reported for the first time from this country.

[A.S.] J.E.P.

138—TRINIDAD & TOBAGO, 1969. "Report of Research Station, 1966-68." *Champ Fleurs: Trinidad & Tobago Coconut Research Ltd.*, 66 pp. [Plant nematodes pp. 4–5, 8–30, 34–37.]

Further details are given of Fenwick's work on *Rhadinaphelenchus cocophilus* on coconut. J.E.P.

139—WEST INDIES, 1969. "Report of the Faculty of Agriculture, University of the West Indies, 1967–1968." *Kingston: Univ. of the West Indies*, 269 pp. [Plant nematodes pp. 69–70.]

Nematicide field experiments, population and host range studies have continued during the year as part of the survey of nematode problems of bananas in the Windward Islands. *Commelina* sp. (water grass) harbours large populations of *Rotylenchulus* sp., larvae of which (in the laboratory) infected banana roots, developed and laid eggs in less than 10 days. Several other weeds support population of *Rotylenchulus* sp. and *Helicotylenchus* sp. Basamid [dazomet], Temik, Nemacur and DBCP trials are in progress. B.G.

140 WEST INDIES, UNIVERSITY Report of the Faculty of Agriculture, 1968-69. St. Augustine, Trinidad. (1970) 291 pp. [En, Plant Nematology, Section D. Research reports pp. 1-2; Section E, pp.98-100]

Inoculation experiments with *Meloidogyne* on pigeon pea were unsuccessful: large numbers of at least 2 species of *Xiphinema* were found on lettuce at St. Augustine, Trinidad: the soil in a plot of cassava with symptoms of virus disease contained nematodes in 5 plant-parasitic genera as well as dorylaims. Nematode problems of banana were studied in St. Lucia, Windward Islands. It was found that fallowing was not economic, that banana nematode populations were greatest from November to January and least in April and that. *Rotylenchulus* sp. caused necrosis to banana feeder roots. Of a number of nematicides tested, DBCP gave the best crops, and the best treatment for banana corms was peeling and dipping in aldrin and DBCP. MTF

—ADAM, A. V. & RODRIGUEZ, A., 1970. 'Clean seed' and 'certified seed' programmes r bananas in Mexico." *Pl. Prot. Bull. F.A.O.*, (3), 57–63.

t potential banana land in tropical Mexico is irently free from *Radopholus similis*. Detailed uctions are given for selection, treatment and ting of banana seed pieces designed for the duction of "clean seed" and "certified seed". M.T.F.

2 DAO D., F., 1970. "Climatic influence on ie distribution pattern of plant parasitic and oil inhabiting nematodes." *Meded. LandbHoo-esch. Wageningen*, 70 (2), 1–181. [Spanish & Dutch summaries pp. 145–162.]

is treatise includes a comprehensive bibliography oil, plant, freshwater and marine nematodes. A ion is devoted to techniques and apparatus for pling and culturing nematodes, and to equip-nt and methods for estimating densities and station levels of nematodes in soils, plant tissues in culture. Environmental influences on soil natodes and the effect of climate, particularly perature, soil and plant factors on the develop-nt of populations are discussed. The nemato-nas of different climatic zones in Venezuela and Netherlands are compared. Climatic effects on ferences in composition of the nematofauna were died by means of transmission and inoculation eriments in which the influences of soil, host other organisms were excluded. Species studied e *Meloidogyne* spp., *Aphelenchus avenae*, *Di-nchus* spp., *Helicotylenchus dihystera* and *Pra-nchus crenatus*. Air pressure did not affect roduction and therefore does not limit the graphical range of a species. The effect of perature on the survival and biology differs ween species and between populations of a cies. The climatic or geographical range of a natode is closely related to lethal temperatures or he optimum for activity or to various combina-ns of these. Temperatures of 25°C. and above re lethal to plant nematodes from the temperate e in unplanted soil, and temperatures of 5°C. or ow were lethal to nematodes from the tropical e in 0·5 to 3·5 months. Tropical populations ame active at 15°C. and thrived at 25 to 35°C. mperate populations, i.e. those from the Nether-ds and from Venezuelan mountains, survived y low temperatures and became active at 10°C. e optimum range was different for each species. e temperature requirements of different popula-ns of the same species showed stable differences ich are probably genetically controlled. The uence of temperature on the morphology and marked physiological specialization within the cies illustrates the value of the species concept work with nematodes. A.J.

—DECKER, H.; CASAMAYOR GARCIA, .; RODRIGUEZ FUENTES, M. E., 1970. Further investigations on the control of para-tic nematodes in banana plant materials." Abstract.] *International Nematology Symposium 10th), European Society of Nematologists, Pescara*, -13 Sept., 1970. Summaries, pp. 162–163. Also in French, German & Italian.]

—EDMUNDS, J. E., 1970. "Effect of fallow-g on banana nematodes and on crop yield." *ropic. Agric., Trin.*, 47 (4), 315–319.

udy was made in the Windward Islands, West ies, to determine the economic feasibility of ing land used for banana crops fallow as a means nematode control. A comparison was made veen land left fallow with weeds, bare, or under inuous banana cultivation. Nematode counts e taken from roots and soil for 11 months before anting with a new banana crop. *Rotylenchulus* was the predominant nematode associated with ana and weeds, surviving for several months in absence of the host plant. Although there was a siderable decrease in nematode population after fallow period, neither bunch weight nor total duction of the new crop was increased. Fallow-is considered to be uneconomic; continuous ana production with chemical control is re-mended. C.E.S.

145—GUTIÉRREZ Z., G.; JIMÉNEZ Q., M. F., 1970. [Some observations on the grafting of coffee practised in Guatemala and El Salvador as a means of controlling nematodes.] "Algunas observaciones sobre la injertación del café practicada en Guatemala y El Salvador como medio para el control de nemátodos." *Revta cafet., (Guatem.)*, No. 98, pp. 35–47.

Propagation of coffee by grafting is described. Guatemalan plants may owe their vigour to their resistance to *Meloidogyne exigua*. In El Salvador, *Pratylenchus coffeae* is predominant and can attack the roots of grafted plants. [From *Hort. Abstr.*, 41, No. 7770.] M.T.F.

146 GUYANA. MINISTRY OF AGRICULTURE. Annual Report for the year 1970. Guyana:. (1971?) 200 pp. [En, Plant nematology pp.III-8, III-18-19.]

Rhadinaphelenchus cocophilus is reported as being responsible for 7% of early deaths in coconut palms, *Cocos nucifera*, in a survey carried out along the Pomeroon River, Guyana. The reduction in rice yield due to nematodes is estimated to range from 10 to over 20%. *Tylenchorhynchus* spp. and *Tylenchus* spp. were the most prevalent nematodes found in rice but *Rotylenchus, Helicotylenchus, Aphelenchus, Psilenchus, Criconemoides* and *Hemicycliophora* species were also found. The presence of *Meloidogyne* spp. in virgin soils is thought to be a possible limiting factor for the growth of peanuts in the area. BG

147—GRISSE, A. T. DE & MAAS, P. W., 1970. "*Macroposthonia longistyleta* n.sp. and *Discocriconemella surinamensis* n.sp. from Surinam (Nematoda: Criconematidae)." *Nematologica*, 16 (1), 123–132. [French summary p. 131.]

Macroposthonia longistyleta n.sp. and *Discocriconemella surinamensis* n.sp. are described from soil around roots of forest vegetation at Boboenhol, Surinam. *M. longistyleta* differs from all the other *Macroposthonia* spp. in the possession of a long curved stylet, sigmoid vagina, and strongly projecting submedian lobes. *M. bakeri* and *M. incrassata* have such a stylet but it is not curved, neither is the vagina. *Macroposthonia* spp. with a sigmoid vagina differ completely in their other features. *D. surinamensis* most closely resembles *D. yossifovichi* but has fewer annules and lacks labial plates. It differs from other smooth-annuled *Discocriconemella* spp. in body and stylet length. K.J.O.W.

148—MAAS, P. W. T., 1970. "Contamination of the palm weevil (*Rhynchophorus palmarum*) with the red ring nematode (*Rhadinaphelenchus cocophilus*) in Surinam." *Nematologica*, 16 (3), 429–433. [French summary p. 432.]

Five specimens of healthy 4 to 7-year-old trees (coconut, oil palm, and the wild palms *Mauritia flexuosa* and *Maximiliana maripa*) were inoculated with *Rhadinaphelenchus cocophilus*. 5 months after inoculation, 2 oil palms and 2 coconut palms had died from red ring disease and nematodes were abundant in the red discoloured stem tissue. One year after inoculation, the remaining trees were felled. 3 showed symptoms of little leaf and *R. cocophilus* was found on the deformed leaves. Contaminated palm weevil larvae were found in the crowns of several trees. It was found that the red ring nematode and its vector, the palm weevil, could breed in newly felled trunks of cultivated and wild palms. C.E.S.

149—MARTÍNEZ R., G. J., 1970. [*Rhynchophorus palmarum* L. (Coleoptera, Curculionidae) carrier of the nematode of "red ring" in Venezuela.] "*Rhynchophorus palmarum* L. (Coleoptera, Curculionidae) portador del nemátodo del 'anillo rojo' en Venezuela." *Revista de la Facultad de Agronomía*, 5 (4), 81–85. [Es, en] Facultad de Agronomía, Univ. Central de Venezuela, Maracay, Venezuela.

Rhynchophorus palmarum collected on a coconut plantation in Venezuela were examined for *Rhadinaphelenchus cocophilus*. Nematodes were found in or on 47 of the 104 beetles examined. M.T.F.

150—NAVARRO A., R. & BARRIGA O., R., 1970. "Control de nemátodos fitoparásitos por medio de rotación con cultivos resistentes a estos organismos." *Revta Inst. colomb. Agropéc.*, 5 (3), 173–184.

A rotation experiment was carried out in field soil at Palmira, Colombia, containing large populations of *Rotylenchulus*, *Meloidogyne*, *Pratylenchus*, *Helicotylenchus* and *Tylenchorhynchus*. The crops grown were tomato, bean (*Phaseolus vulgaris*), *Crotalaria spectabilis* and *Tagetes minuta*. Numbers of nematodes were greatly reduced after *Tagetes* and, to a lesser extent, after *Crotalaria*. The latter is a more acceptable crop because of its use as green manure. M.T.F.

151—OGIER, T. P. & MERRY, C. A. F., 1970. "Yield decline of plantains, *Musa paradisiaca*, in Trinidad associated with the nematode *Pratylenchus* sp." *Turrialba*, 20 (4), 407–412. [Spanish summary p. 407.]

A trial 10-acre field of plantain (*Musa paradisiaca*), under good management, yielded well in the first year but declined during the second with a 53% reduction in yield. The roots were found to be severely damaged by *Pratylenchus* sp. DBCP injections reduced infestation and new roots were formed but nematode infestation built up during the following year making annual treatment with nematicide necessary. M.T.F.

152—PEREZ B., J. B., VAN GUNDY, S. D., STOLZY, L. H., THOMASON, I. J. & LAIRD, R. J., 1970. "*Pratylenchus thornei*, a nematode pest of wheat in Sonora, Mexico." [Abstract.] *Phytopathology*, 60 (9), 1307.

D-D was effective against this nematode, but correlation of planting date with soil temperature may provide a more economical method of control. P.S.G.

153—RODRIGUEZ, M. R.; TELIZ, O., 1970. "Nematodes associated with banana roots in the region of Chontalpa, Tab., Mexico." [Abstract.] *International Nematology Symposium* (10th), *European Society of Nematologists, Pescara*, 8-13 Sept., 1970. Summaries, pp. 150–151. [Also in French, German & Italian.]

154—ROMAN, J. & KOIKE, H., 1970. "Preliminary studies on the interaction of *Pratylenchus brachyurus* and *Pythium graminicola* on sugarcane." [Abstract.] *Phytopathology*, 60 (11), 1541.

155—SOTERO PALACIOS, A., 1970. "Distribution, identification and chemical control of root-knot nematodes (*Meloidogyne* spp.) in tomato plants in the State of Morelos." [Abstract.] *International Nematology Symposium* (10th), *European Society of Nematologists, Pescara*, 8-13 Sept., 1970. Summaries, pp. 148–149. [Also in French, German & Italian.]

156—TARTÉ, R., 1970. "Reconocimiento nemátodos asociados con diversos cultivos en Panamá." *Turrialba*, 20 (4), 401–406. [English summary p. 401.]

The commonest genera of plant parasitic nematodes found in a survey in the Republic of Panama, were *Aphelenchus*, *Helicotylenchus*, *Meloidogyne*, *Pratylenchus* and *Rotylenchulus*. Lists are given of the nematodes found, their associated crops and the locations. 14 nematodes are recovered for the first time in Panama. *Rotylenchulus* was found only in the lowlands and *Trichodorus* only at higher altitudes. *Gracilacus* and *Paratylenchus* were associated with fruit crops and *Tylenchulus* mainly with ornamental plants. *Heterodera rostochiensis* was associated only with potato, *Radopholus similis* only with banana, *Hirschmanniella* sp. only with rice and *Scutellonema* sp. only with yam. [From English summary.] M.T.F.

157—TRINIDAD, 1970. "Citrus Research 1970. Annual Report of the Citrus Research Unit of the University of the West Indies for the period July 1969-June 1970." *Trinidad: University of the West Indies*, 63 pp. [En] [Plant nematology pp. 7–13. 21–24.]

In a survey of citrus in the Stann Creek Valley, British Honduras, *Tylenchulus semipenetrans* was found in some groves. *Dorylaimus*, *Longidorus*, *Xiphinema* and *Criconemoides* were also found. In Trinidad, *T. semipenetrans* was found in a few citrus groves but not in the Citrus Research Nursery. M.T.F.

158—VICTORIA K., J., SANCHEZ P., A. & BARRIGA O., R., 1970. "Erradicación de palmas de cocotero afectadas por el anillo rojo (*Rhadinaphelenchus cocophilus* Cobb 1919, Goodey 1960, Nematoda: Aphelenchoididae), mediante la utilización de sustancias químicas." *Revta Inst. colomb. Agropéc.*, 5 (3), 185–197.

Weedicide (sodium and potassium arsenite), Tordon 101 (picolinic acid with 2,4-D) and Penite (arsenic pentoxide) were injected into the trunks of *Rhadinaphelenchus cocophilus*-infected coconut palms in Colombia, in tests to assess the efficacy of these chemicals in killing both trees and nematodes as an alternative to cutting and burning infected trees. Doses used were 20, 30, 40, 50, 60 and 70 ml. of chemical per palm. Details of methods of application are given. Penite killed trees the quickest—96·4% in 2 weeks at a dosage of 30 ml. but Weedicide had the best nematicidal activity—76·7% by the 9th week at 40 ml. Taking into account toxicity to users and the economics of application, the authors recommend Weedicide at a minimum dose of 40 ml. for infected palm eradication. P.S.G.

159 WEST INDIES, UNIVERSITY Report of the Faculty of Agriculture, 1969-70. St. Augustine, Trinidad. (1971) 142 pp. [En, Plant Nematology, Section F, pp. 19-20.]

In a banana plantation in St.Lucia, Windward Islands, the commonest nematodes were *Rotylenchulus reniformis* in the soil and *Radopholus similis* on the roots. The weed *Commelina* is a host for *Rotylenchulus reniformis* and eradication of the weed from banana fields is recommended. In a 3 year experiment on the effects of fallowing, the nematode population was much reduced in fallowed plots but banana yields did not increase. DBCP injected round banana plants at 3 gal per acre per annum gave better results than other nematicides tested, but was phytotoxic if applied immediately after planting. Application one month or more after planting was harmless. MTF

160—YEPEZ T., G.; MEREDITH, J. A., 1970. [Plant parasitic nematodes in Venezuela.] "Nemátodos fitoparásitos en cultivos de Venezuela." *Revista de la Facultad de Agronomía*, 5 (4), 33–80. [Es, en] Facultad de Agronomía, Univ. Central de Venezuela, Maracay, Venezuela.

Plant-parasitic nematodes in Venezuela are listed under host plant and locality, the records being based on a study of 660 soil and root samples from the principal agricultural regions and on information from other workers and in publications. An analysis of the records indicates that the main problems, in order of importance, are: *Meloidogyne* spp. on vegetables, tomato, coffee and tobacco; *Rhadinaphelenchus cocophilus* on coconut and oil palm; *Tylenchulus semipenetrans* on various forms of citrus; *Ditylenchus dipsaci* on garlic; and *Hirschmanniella oryzae* and *H. spinicaudata* on rice. The authors recommend increased study and training in nematology and the initiation of a national crop protection programme. There are 58 references. [From English summary.] M.T.F.

161—AYALA, A., 1971. "Rotation with pangola-grass and sugarcane beneficial for pineapple production in Puerto Rico." [Abstract.] *Nematropica*, 1 (1), 6–7. [Also in Spanish pp. 25–26.]

In pangola-grass rotations *Meloidogyne incognita* disappeared after 12 months and *Criconemoides* and *Helicotylenchus* after 18 months. In sugar-cane rotations *Rotylenchulus reniformis* disappeared in 2 years. M.T.F.

162—AYALA, A.; ACOSTA, N., 1971. "Observations on yam (*Dioscorea alata*) nematodes." [Abstract.] *Nematropica*, 1 (2), 39–40, 44–45. [En, Es] Dept. de Entomologie, Estación Experimental Agrícola, Rio Piedras, Puerto Rico.

Population fluctuations of plant-parasitic nematodes on *Dioscorea alata* farms in Puerto Rico were studied: warm water treatments and chemical dips for propagation material were tested: a field experiment with nematicides was carried out. The most effective nematicide was D-D. The principal nematodes affecting the yams were *Scutellonema bradys* and *Pratylenchus coffeae*, but the variety Florido was not susceptible. On some farms *S. blaberum* and *Meloidogyne* were found in large numbers. M.T.F.

163—AYALA, A., ACOSTA, N. & ADSUAR, J. A., 1971. "A preliminary report on the response of *Carica papaya* to foliar applications of two systemic nematicides." [Abstract.] *Nematropica*, 1 (1), 10. [Also in Spanish pp. 29–30.]

[Nemacur and DuPont 1410 against *Rotylenchulus reniformis* and *Meloidogyne incognita* on *Carica papaya*.]

164—AYALA, A., ACOSTA, N. & JULIÁ, F., 1971. "Increases in pigeonpea yields by soil fumigation." [Abstract.] *Nematropica*, 1 (1), 11–12. [Also in Spanish p. 31.]

[Dasanit, Vorlex, Nemagon, Nemacur and D-D against *Rotylenchulus reniformis* on *Cajanus cajan* in Puerto Rico.]

165—BAEZA A., C. A., 1971. "Plant-parasitic nematodes associated with tomato in the Cauca River Valley." [Abstract.] *Nematropica*, 1 (1), 9. [Also in Spanish pp. 28–29.]

[10 genera found: *Rotylenchulus reniformis* pathogenic in experiments.]

166—BARRIGA O., R., 1971. "Survey of plant-parasitic nematodes associated with tobacco in Colombia." [Abstract.] *Nematropica*, 1 (1), 1. [Also in Spanish p. 19.]

[Mainly *Meloidogyne*, *Rotylenchulus reniformis* and *Helicotylenchus*.]

167—BARRIGA O., R., MORENO, A. & ARANDA, A., 1971. "Chemical control of *Meloidogyne* sp. in tobacco in the state of Santander, Colombia." [Abstract.] *Nematropica*, 1 (1), 12. [Also in Spanish p. 31.]

[Fensulfothion and methomyl more effective than Di-Trapex [Vorlex].]

168—DAO, F. & GONZÁLEZ, J. A., 1971. "The golden nematode and its distribution in the Venezuelan Andes." [Abstract.] *Nematropica*, 1 (1), 12. [Also in Spanish p. 32.]

[New record of *Heterodera rostochiensis* for Venezuela.]

169—DAO D., F.; GONZÁLEZ, J. A., 1971. [The golden nematode of potato, *Heterodera rostochiensis* Woll. and its presence in the Venezuelan Andes.] "El nemátodo dorado de la papa, *Heterodera rostochiensis* Woll. y su presencia en los Andes Venezolanos." *Agronomía trop.*, 21 (2), 105–110. [English summary p. 110.]

Heterodera rostochiensis is reported for the first time from Venezuela. Cysts were found in soil samples from potato fields in Mérida and Tachira States, but not in the samples from Trujillo, Lara, Carabobo or Yaracuy States. All positive sites were more than 2,000 metres above sea level. Damage to potato plants was apparent in some areas. P.S.G.

170—EDMUNDS, J. E., 1971. "Association of *Rotylenchulus reniformis* with 'Robusta' banana and *Commelina* sp. roots in the Windward Islands." *Trop. Agric., Trin.*, 48 (1), 55–61.

A survey of a banana estate in St. Lucia, Windward Islands, revealed that water grass (*Commelina* sp.) and banana harboured large numbers of *Rotylenchulus reniformis*. Stained roots of both plants showed well-developed females with eggs. Laboratory and glasshouse tests on bananas, using inocula from the estate, showed that eggs were produced 7 days after infection. Necrosis of banana roots was always associated with the presence of sessile females. Egg counts gave a maximum of 265 eggs per egg mass 56 days after inoculation of larvae. Hatching rates per egg mass varied considerably and after 74 days, egg production was obviously declining. K.J.O.W.

171—EDMUNDS, J. E., 1971. "Association of *Rotylenchulus* sp. with roots of the 'Robusta' banana and *Commelina* sp. in the Windward Islands." [Abstract.] *Nematropica*, 1 (1), 1. [Also in Spanish pp. 19–20.]

172—EDMUNDS, J. E., 1971. "Recent investigations on banana nematode control in the Windward Islands." [Abstract.] *Nematropica*, 1 (1), 12–13. [Also in Spanish p. 32.]

[Two one-gal. doses of DBCP better than one 3-gal. dose.]

173—EDWARDS, D. I. & WEHUNT, E. J., 1971. "Host range of *Radopholus similis* from banana areas of Central America with indications of additional races." *Pl. Dis. Reptr*, 55 (5), 415–418.

Isolates of *Radopholus similis* from bananas in Honduras and Panama were used in tests of a number of weeds, crops and potential cover crops to determine the nematode's host range. 6 crop plants and 4 weed species are recorded as new hosts. *Citrus* spp. were not attacked by either isolate of the nematode. *Zea mays* and *Vigna sinensis* were hosts of the Honduras isolate but not of the Panama isolate. The opposite was true for *Tephrosia vogelii*, suggesting that more than one "banana race" of *Radopholus similis* may occur in Central America. M.T.F.

174—FIGUEROA M., A. & JIMÉNEZ, M. F., 1971. "Pathogenicity of *Hypsoperine* n.sp. on several rice varieties." [Abstract.] *Nematropica*, 1 (1), 1–2. [Also in Spanish p. 20.]

[No description of *Hypsoperine* n.sp.]

GATEVA, S.; PENTON, G. [Phytonematode fauna at different in two rice varieties and the fauna of rice field weeds.] Fauna de atodos en diferentes etapas de dos variedades de arroz y fauna de malas encontradas en el arrozal. *Ciencias Agropecuarias, Serie 1, Ingenieria mica* (1971) No. 10, 19 pp. [Es] Escuela de Agronomía, Facultad de s Agropecuarias, Univ. de la Habana, Cuba.

ne nematode fauna of rice varieties IR-8 and Blue-Bonnet during growth, ng and ripening in Cuba, is described. Altogether 65 species are listed, 56 of are previously unrecorded from rice in Cuba. *Panagrolaimus hygrophilus* was ly dominant species on IR-8; *P. hygrophilus, Pratylenchus zeae* and *aimus limnophilus* were dominant on Blue-Bonnet. In general, populations igher on Blue-Bonnet than IR-8. *P. zeae* was unusual in that it reached um numbers at flowering rather than at ripening. Examination of rice field (*Eleusine, Andropogon, Digitalia [Digitaria]* and *Echinochloa*) revealed 24 s of nematode, more than a quarter of which were parasites of rice. *P. zeae* ne of the most common. PSG

GATEVA, S.; PENTON, G. [First contribution to the nematode fauna of sugar-cane (*Saccharum officinarum*) and changes after g.] Primera contribucion de la fauna de los fitonematodos de la caña de (*Saccharum officinarum*) y los cambios que sufre despues de la quema. *as Agropecuarias, Serie 1, Ingenieria Agronomica* (1971) No. 9, 18 pp. [Es] de Agronomía, Facultad de Ciencias Agropecuarias, Univ. de la Habana,

Examination of the soil and roots in sugar-cane plantations in Cuba before and burning, showed a considerable reduction in nematode numbers and species in ots after burning but no reduction in the nematodes in the soil. The number pecies of all nematodes found are given: 40 of the 106 species are new for cane in Cuba. *Pratylenchus zeae, Ditylenchus triformis, D. intermedius* and *eloides buetschlii* were the predominant forms in the roots of the sugar-cane. of the nematodes were found in the top 20 cm of soil and few were found 40 cm. PSG

117—HOYLE, J. C., 1971. "Preliminary investigations into the use of systemics for control of red ring disease of coconuts." *Expl Agric.*, **7** (1), 1–8. [En] Trinidad & Tobago Coconut Research Ltd., Champs Fleurs, Trinidad.

In tests for control of red ring disease of young coconut palms, caused by the nematode *Rhadinaphelenchus cocophilus* in Trinidad, 3 methods of applying nematicides were used. Bidrin (dimethyl 2-dimethylcarbamoyl-1-methylvinyl phosphate) and Nemacur were injected into the stem of the coconut palm at 2·4 and 2·0 g. per tree, respectively. Lannate (methomyl) at 5 g. per tree, Nemacur at 10 g. per tree and Temik (aldicarb) at 10 and 5 g. per tree were applied to the leaf axils and Lannate, Nemacur and Temik all at 10 g. per tree were applied directly to the soil. Stem injection was found to be impractical due to the rapid breakdown of the chemicals and the damage to the trees. Of the 3 compounds applied to leaf axils, only Temik was absorbed in significant amounts. All compounds applied to the soil were well absorbed by the roots and leaf extracts were lethal to a high percentage of *Turbatrix aceti* in *in vitro* tests. Lannate broke down too quickly to be of practical use. J.H.B.

LIU, L. J. ; ADSUAR, J. ; PÉREZ, J. E. Diseases of sugarcane and control in Puerto Rico. *Journal of Agriculture of the University of Puerto* (1971) 55 (2) 139-146 [En, es] Agricultural Experiment Stn., Mayagüez us, Univ. of Puerto Rico, Rio Piedras, Puerto Rico.
Root rots of some varieties of sugar-cane in Puerto Rico, caused by fungi and todes (unnamed), reduced germination by up to 40% in poorly-drained areas. MTF

179—LIU, L. J. & AYALA, A., 1971. "Pathogenicity of *Fusarium* spp. and their relation with *Trichodorus christiei* on sugarcane in Puerto Rico." [Abstract.] *Nematropica*, **1** (1), 7. [Also in Spanish p. 26.]

[Positive interaction affecting root but not top growth.]

MAAS, P. W. T.; IMAMBAKS, M. J. [Nematodes in bananas in Surinam.] atoden bij bacoven in Suriname. *Surinaamse Landbouw* (1971) 19 (1) 32-49 en] Landbouwproefstation, Surinam. From *Horticultural Abstracts 42*, 6959.
Damage by and control of nematodes in banana in Surinam: mainly *pholus similis* and *Helicotylenchus multicinctus*.].

181—MAAS, P. W. T.; LOOF, P. A. A.; GRISSE, A. DE, 1971. "*Nothocriconemoides lineolatus* (n.gen., n.sp. Nematoda: Criconematidae)." *Meded. Fak. LandbWetens. Gent*, 36 (2), 711–715. [En, fr, de, nl] Plantenziektenkundige Dienst, Wageningen, Netherlands.

Nothocriconemoides lineolatus n.g., n.sp. from sandy jungle forest soil near Carolina, Surinam, is described and illustrated. The new genus is characterized by the second annule being offset by a narrow third "collar-like" annule, the presence of 4 distinct submedian lobes, a closed vulva with anterior lip overhanging, and juveniles without rows of scales on the posterior margins of the annules. The genus resembles both *Criconema* and *Nothocriconema* (especially the *Nothocriconema annuliferum* group) but differs from both in the possession of 4 large distinct submedian lobes in the female and in the absence of scale rows in the juveniles. K.J.O.W.

182—OSORIS, J., 1971. "Outbreaks and new records. Venezuela. Golden potato cyst nematode." *Pl. Prot. Bull. F.A.O.*, **19** (2), 46.

Heterodera rostochiensis is recorded in Venezuela for the first time from a potato field in the Santo Domingo area in the Venezuelan Andes. M.T.F.

183—PALACIOS, A. & SOSA MOSS, C., 1971. "Genetic resistance of several varieties of tomato (*Lycopersicon esculentum*) to attack by *Meloidogyne* spp." [Abstract.] *Nematropica*, **1** (1), 4. [Also in Spanish p. 22.]

184—ROMÁN, J. & KOIKE, H., 1971. "Preliminary studies on the interaction of *Pratylenchus brachyurus* and *Pythium graminicola* in sugarcane." [Abstract.] *Nematropica*, **1** (1), 7. [Also in Spanish p. 26.]

[No interaction shown.]

185—ROMÁN, J.; RIVAS, X., 1971. "Nematode contamination in tap water." [Abstract.] *Nematropica*, **1** (2), 39, 44. [En, Es] Agricultural Experimental Stn, Univ. of Puerto Rico, Rio Piedras, Puerto Rico.

Tap water from 12 localities in Puerto Rico contained 17 genera of plant-parasitic and 13 genera of free-living nematodes. M.T.F.

186—ROMAN, J., RIVAS, X. & RODRIGUEZ, F., 1971. "Chemical control of nematodes in pepper in Puerto Rico." [Abstract.] *Nematropica*, **1** (1), 15. [Also in Spanish pp. 34–35.]

187—SCHIEBER, E., 1971. "The nematode problems of coffee in Guatemala." [Abstract.] *Nematropica*, **1** (1), 17. [Also in Spanish p. 36.]

[*Pratylenchus coffeae, Meloidogyne exigua* and *Xiphinema americanum*.]

188—SINGH, N. D., 1971. "A survey for the causes of the early death of coconut palms (*Cocos nucifera* L.) in the Pomeroon River area, Guyana." [Abstract.] *Nematropica*, **1** (1), 17. [Also in Spanish pp. 36–37.]

[7% mortality due to *Rhadinaphelenchus cocophilus*.]

—TARJAN, A. C., 1971. "Some interesting sociations of parasitic nematodes with cacao nd coffee in Costa Rica." [Abstract.] *Nemaopica*, 1 (1), 5. [Also in Spanish p. 24.] luding first record of *Radopholus similis* on ee in Western hemisphere.]

—TARTÉ, R., 1971. "Distribution and nemade populations in horticultural farms intensively ultivated." [Abstract.] *Nematropica*, 1 (1), 6. Also in Spanish pp. 24–25.] *tylenchulus reniformis*, *Meloidogyne* sp., *Helicotylenchus dihystera* and *H. microcephalus*.]

—TARTE, R., 1971. [Studies on the distribution and population of nematodes in intensively ultivated horticultural farms.] "Estudios sobre a distribución y poblaciones de nematodos en ncas de hortalizas intensamente cultivadas." *Turrialba*, 21 (1), 34–37. [Es, en] Facultad de gronomia, Univ. de Panama. *tylenchulus reniformis*, *Meloidogyne* sp., *Helicotylenchus dihystera* and *H. microcephalus* comprised main elements of the nematode fauna of allholdings on the outskirts of Panama City. *reniformis* populations were highest on *Phaseolus garis* and lowest on *Capsicum frutescens*. *Meloidoe* sp. populations were highest on *C. frutescens* l lowest on *Allium fistulosum*. P.S.G.

—VÁZQUEZ, J. T., 1971. "Principal nematological problems in Mexico." [Abstract.] *Nematropica*, 1 (1), 11. [Also in Spanish p. 30.] *leterodera punctata*, *Pratylenchus*, *Tylenchorhynus* and *Helicotylenchus* associated with maize: *tylenchus dipsaci* on lucerne: *Tylenchulus semietrans* and *Radopholus similis* on citrus: *Hirschmanniella* on rice: *Meloidogyne exigua* on coffee.]

193—VICTORIA K., J. I., 1971. "Eradication as an effective control for red ring disease of coconut palm caused by *Rhadinaphelenchus cocophilus* (Cobb, 1919) Goodey, 1960." [Abstract.] *Nematropica*, 1 (1), 8–9. [Also in Spanish pp. 27–28.] Partial control by destruction of infected trees.]

194—WEHUNT, E. J.; EDWARDS, D. I., 1971. "Intra-uterine egg development of *Pratylenchus coffeae* (Zimmerman) Filipjev and Schuurmans Stekhoven." *J. Nematol.*, 3 (4), 422–423. [En] Vining C. Dunlop Laboratories, Tela Railroad Company, La Lima, Honduras.

Intra-uterine development of the eggs of *Pratylenchus coffeae* on *Musa paradisiaca* in Honduras is reported. A photograph taken whilst the female and larvae were still alive shows eggs containing larvae developed to the prehatch stage. C.E.S.

195—BAEZA A., C. A., 1972. "The golden nematode (*Heterodera rostochiensis* Woll.) in Colombia." [Abstract] *Nematropica*, 2 (1), 1, 15. [En, Es] Apto. Aéreo 233, Agropecuaria Palmira, Colombia.

Heterodera rostochiensis was found in soil samples from 6 of 8 localities in Colombia and Ecuador. M.T.F.

196—BANGUERA, R. L.; SÁNCHEZ POTES, A., 1972. [Efficacy of various chemicals in killing coconut palms infected with red ring (*Rhadinaphelenchus cocophilus*) Cobb, Goodey.] "Efectividad de algunas sustancias químicas para la erradicación de palmas de cocotero afectadas por el anillo rojo (*Rhadinaphelenchus cocophilus*) Cobb, Goodey." *Acta Agronomica, Palmira*, 22 (1), 33–42. [Es, en]

Cacodilic acid, picolinic acid with 2,4-D and sodium arsenate were used to kill *Rhadinaphelenchus cocophilus*-infected trees in coconut plantations along the Colombian Pacific coast. Cacodilic acid at 20 to 30 ml/tree was the most effective since it was highly nematicidal as well as phytotoxic. The other 2 chemicals were also effective at 50 ml/tree and 70 ml/tree, respectively. P.S.G.

197 BRATHWAITE, C. W. D. Preliminary studies on plant-parasitic nematodes associated with selected root crops at the University of the West Indies. *Plant Disease Reporter* (1972) 56 (12) 1077-1079. [En] Dept. of Crop Science, The Univ. of the West Indies, St. Augustine, Trinidad.

Nine genera of nematodes were found on crops of dasheen (*Colocasia esculenta*), cassava (*Manihot esculenta*), tannia (*Xanthosoma sagittifolium*), sweet-potato (*Ipomoea batatas*) and cush cush yam (*Dioscorea trifida*) grown at the University of the West Indies, Trinidad. *Meloidogyne* sp. and *Helicotylenchus* sp. were found on all crops and *Rotylenchulus reniformis* and *Tylenchorhynchus* sp. on sweet-potato and tannia. CES

198 BRATHWAITE, C. W. D. *Colocasia esculenta*, a new host of *Meloidogyne incognita* in Trinidad. *Plant Disease Reporter* (1972) 56 (7) 618 [En] Dept. of Crop Science, The Univ. of the West Indies, St. Augustine, Trinidad, West Indies.

Examination of root samples of *Colocasia esculenta* from an irrigation canal in Trinidad, revealed egg masses, juveniles and several mature females of *Meloidogyne incognita*. JHB

199—COATES, P. L., 1972. "Response of an established banana planting to four nematicides." *Pest Articles & News Summaries*, 18 (2), 165–170. [En] Banana Board, P.O. Box 602, Kingston, Jamaica.

Radopholus similis is the major pathogen on banana in Jamaica and toppling of plants decreases production more than pseudostem breakdown. The results of 3 applications of nematicides at 6--monthly intervals showed that injection of DBCP gave better nematode control than granule dressings of Nemacur P, Temik and Lannate, and decreased toppling. G.O.

200—COLÓN FERRER, M.; AYALA, A.; CUEBAS, D., 1972. "Preliminary results of an experiment with nematicides for the control of nematodes attacking tomato (*Lycopersicon esculentum* Mill.) in sandy soils." [Abstract] *Nematropica*, 2 (1), 2–3, 16–17. [En, Es] Agricultural Extension Service, College of Agricultural Sciences, U.P.R., Mayagüez, Puerto Rico.

In experiments on the control of *Meloidogyne incognita* on tomato in Puerto Rico the nematicides D-D, Dasanit, Nemacur and Tirpate were applied at 2 dosage rates each. In all treatments growth was better and yields were higher than in the controls. Greatest yields were on the plots with Dasanit at 30 lb active ingredient per acre (174% more than on control plots) and D-D gave the lowest increase with yields 42% greater than the controls. Root-knot infestation was least on the Nemacur plots. M.T.F.

201 CRILL, P.; ARTHURTON, P. A. J.; MEADE, N.; PHELPS, R. H. The economic impact of tomato diseases in Montserrat. *Plant Disease Reporter* (1972) 56 (9) 817-819 [En] Plant Pathology Dept., Univ. of Florida, Agricultural Research & Education Center, Bradenton, USA.

A survey of commercial tomato fields on the Caribbean island of Montserrat showed that, of the many diseases and pests observed, fruit diseases and root-knot nematodes caused the greatest yield loss. CES

202 DAO D., F. [Influence of different crops on the population of nematodes.] Influencia de diferentes cultivos en las poblaciones de nematodos. *Nematropica* (1972) 2 (2) 30-32 [Es, en] Servicio Shell para el Agricultor, Cagua, Venezuela.

Field trials in Venezuela on tomato, onion, *Capsicum frutescens*, maize, sorghum, marigold and carrot in soils in which *Rotylenchulus reniformis* and *Helicotylenchus erythrinae* predominated, showed that all crops were good hosts of *R. reniformis*, particularly tomato. There was no marked increase in *H. erythrinae* populations. *Meloidogyne incognita* appeared in significant numbers only on *C. frutescens*. Implications for rotation are briefly considered. PSG

203—DAO, F., 1972. "Influence of different crops on nematode populations." [Abstract.] *Nematropica*, 2 (1), 3, 17. [En, Es] Fundación Shell, Aragua, Venezuela.

204 ESPINOSA, R. G.; ADAMS, A. V. Major diseases of pineapple in Oaxaca, Mexico, and their control. *FAO Plant Protection Bulletin* (1972) 20 (4) 79-87 [En] Colegio Superior de Agricultura Tropical, Cárdenas, Tabasco, Mexico.

Soil samples from pineapple plantations in Mexico contained species of *Criconema, Helicotylenchus, Longidorus, Meloidogyne, Pratylenchus* and *Xiphinema*. Pathogenicity was not investigated. MTF

205 EVANS, A. A. F. The incidence of some plant and soil nematodes in Barbados, West Indies. [Abstract.]. In *International Symposium of Nematology (11th), European Society of Nematologists, Reading, UK, 3-8 September, 1972. Abstracts.* (1972) 20 [En] Imperial College Field Stn., Ascot, Berks, UK.

206—FIGUEROA, M., A., 1972. "Nematological study on banana (*Musa* spp.)." [Abstract] *Nematropica*, 2 (1), 3, 17. [En, Es] Ministerio de Agricultura y Ganadería, Sección de Nematología, San José, Costa Rica.

207—GRANADA C., G. A., 1972. "First report of the root knot nematode *Meloidogyne hapla* Chitwood in Colombia." [Abstract.] *Nematropica*, 2 (1), 5, 19. [En, Es] Centro Nacional de Investigaciones Agropecuarias, Palmira, Colombia.

[*Meloidogyne hapla* on *Chrysanthemum frutescens* and weeds.]

208 HICKLING, G. E. Control of nematodes in stored yams in Jamaica. [Abstract.]. In *International Symposium of Nematology (11th), European Society of Nematologists, Reading, UK, 3-8 September, 1972. Abstracts.* (1972) 28 [En] Plant Protection Division, Ministry of Agriculture and Fisheries, Kingston, Jamaica.

[Control by hot water, DBCP, thionazin.].

209 JIMÉNEZ, Q., M. F. [Annual population fluctuation of *Radopholus similis* in the banana zone of Pococi, Costa Rica.] Fluctuaciones anuales de la poblacion de *Radopholus similis* en la zona bananera de Pococi, Costa Rica. *Nematropica* (1972) 2 (2) 33-40 [Es, en] Ciá Bananera Atlántica Ltda., Aptdo 10076, San José, Costa Rica.

Rainfall appeared to be the most important factor in *Radopholus similis* population dynamics in these banana growing area of Pococi, Costa Rica. Low population levels occurred during or after heavy rain but high peaks or initial accelerated growth occurred during the dry months. During the year of study, nematode populations remained continuously above the level of economic importance. PSG

210—JIMÉNEZ, M. F., 1972. "Seasonal fluctuations of *Radopholus similis* in the banana growing area of Pococi, Costa Rica." [Abstract] *Nematropica*, 2 (1), 6, 20. [En, Es] Cía. Bananera Atlántica Ltda., Aptdo. 10076, San José, Costa Rica.

In root samples taken monthly for a year from bananas on 8 farms in the Pococi area of Costa Rica, a close relationship was found between population levels of *Radopholus similis* and rainfall. Numbers were low after heavy rain and high in drier periods but were sufficient to cause economic loss during the whole year. Soil temperature at a depth of 30 cm did not influence population size. M.T.F.

211 KERMARREC, A.; LA MASSESE, C. S. [SCOTTO LA MASSÈSE, C.] New contributions to the study of the nematode fauna in the French West Indies. *Nematropica* (1972) 2 (2) 41-43 [En, es] INRA, CRAAG, Petit-Bourg, Guadeloupe, West Indies.

A list is given of the plant-parasitic nematodes found in a 3-year survey of 9 major crops, and in forest soil, in the French Antilles, West Indies, with notes on the occurrence and population densities of some selected species. An analysis of changes in the nematode fauna under sugar-cane established after clearing forests has shown an increase in plant-parasitic forms with increasing dominance of *Helicotylenchus erythrinae*. The ratio R (= total nematode population/number of plant-parasitic tylenchs) is introduced to measure the changes taking place in the fauna under cultivation, and examples are briefly given. MTF

212—LA MASSESE, C. S.; KERMARREC, A., 1972. "New contribution to the study of the nematodes of the French Antilles." [Abstract] *Nematropica*, 2 (1), 6–7, 20. [En, Es] I.N.R.A., Stn. de Recherches sur les Nématodes, Antibes, France.

[A survey in the French Antilles, West Indies, describing a method to evaluate the effects of initial cultivations on the nematode fauna.]

213—LIU, L. J.; AYALA, A., 1970. "Pathogenicity of *Fusarium moniliforme* and *F. roseum* and their interaction with *Trichodorus christiei* on sugar-cane in Puerto Rico." [Abstract.] *Phytopathology*, 60 (11), 1540. [En] Agricultural Experiment Stn., Mayaguez, Univ. of Puerto Rico, Rio Piedras.

In experiments on the effects of *Fusarium moniliforme*, *F. roseum* and *Trichodorus christiei* on 5 sugar-cane varieties in Puerto Rico, the pathogens were inoculated separately or fungus and nematode together. There was some evidence of positive interaction between *F. moniliforme* and *T. christiei* on root growth but not on top growth. M.T.F.

214—LOOF, P. A. A.; MAAS, P. W. T., 1972. "The genus *Xiphinema* (Dorylaimida) in Surinam." *Nematologica*, 18 (1), 92–119. [En, de] Landbouwhogeschool, Wageningen, Netherlands.

In Surinam 6 species of *Xiphinema* have been found of which 4 are new. *X. filicaudatum* n.sp. on *Elaeis guineansis* is characterized by a total spear length of 300 μ or more and by its very long filiform tail. *X. surinamense* n.sp. on *Passiflora* sp. and *Citrus* sp. which occurs in a smaller and a larger form, is a round-tailed species, with males having only one mid-ventral supplement. In both species only the posterior female gonad is functional; the uterus of the anterior gonad is identical in size and structure to that of the posterior one, but the anterior ovary and oviduct are lacking. In *X. denoudeni* n.sp. on *Citrus* sp. the anterior gonad is more strongly reduced; tail shape varies from convex-conoid to digitate; males are unknown. *X. imambaksi* n.sp. on *Citrus* sp., of which also only females were found, is a didelphic species possessing a Z-organ; the tail is digitate. The other 2 species found are *X. elongatum* and *X. vulgare*. It is recommended that, in species descriptions in this genus, great attention be given to the structure of the female reproductive system. The hypothesis is put forward that the odontostyle-forming cell does not stop its activity at the same moment of ontogeny in all specimens. A key to *Xiphinema* spp. is given. [A.S.] M.R.S.

215—ROMÁN, J.; RIVAS, X.; REYES, I.; MANGUAL, G., 1972. "Studies on the use of nematicides on vegetable crops." [Abstract] *Nematropica*, 2 (1), 9–10, 23. [En, Es] Agricultural Experiment Stn., U.P.R., Mayagüez Campus, Rio Piedras, Puerto Rico.

216—SINGH, N. D., 1972. "A survey of red ring disease of coconut palm in Grenada, West Indies." *Plant Disease Reporter*, 56 (4), 339–341. [En] Dept. of Crop Science, The Univ. of the West Indies, St. Augustine, Trinidad, West Indies.

A survey of the red ring disease in coconut palms, caused by the nematode *Rhadinaphelenchus cocophilus*, in the island of Grenada, West Indies, showed that 22·3% of the trees were infected with the disease. The palm weevil (*Rhyncophorus palmarum*), vector of the red ring nematode, was present in 92% of the diseased palms. 72% of the palm weevils were infested with red ring nematode. There was no relationship between weevil sizes and their infestation with red ring nematode. C.E.S.

217 SINGH, N. D. Plant-parasitic nematodes associated with some economic crops in Guyana. *Plant Disease Reporter* (1972) 56 (12) 1059-1062 [En] Dep. of Crop Science, The Univ. of the West Indies, St. Augustine, Trinidad.

In a survey of plant-parasitic nematodes associated with 18 economic crops along the coastal plain of Guyana, 17 genera were found and numbers/100 ml soil are tabulated. The most prevalent genera were *Helicotylenchus, Meloidogyne, Rotylenchus, Tylenchorhynchus* and *Tylenchus*. The 13 species considered to be of greatest economic importance are listed. CES

218 SINGH, N. D.; FARRELL, K. M. Occurrence of *Rotylenchulus reniformis* in Trinidad, West Indies. *Plant Disease Reporter* (1972) 56 (6) 551 [En] Dept. of Crop Science, Univ. of the West Indies, St. Augustine, Trinidad.

Severely diseased papaya trees [*Carica gracilis*] growing at the University of the West Indies Field Station, Trinidad, were found to be infested with *Rotylenchulus reniformis*. *Meloidogyne* sp. and *Helicotylenchus* spp. were also associated with the roots. This is believed to be the first record of *R. reniformis* in Trinidad, where it was also associated with okra [*Abelmoschus esculentus*] and pigeon pea [*Cajanus cajan*]. CES

219—TARJAN, A. C.; JIMÉNEZ, M. F.; SORIA V., J., 1972. "Improving yields from nematode-infected cacao trees (*Theobroma cacao* L.) in Costa Rica by use of nematicides." [Abstract] *Nematropica*, 2 (1), 10–11, 23–24. [En, Es] Univ. of Florida AREC, Lake Alfred, Florida, USA.

In Costa Rica, the roots of *Theobroma cacao* were parasitized mainly by *Hoplolaimus galeatus* and *Helicotylenchus erythrinae*. The application of nematicides round the trees resulted in increased yields in the following year. Although the results were not statistically significant they indicated that cacao trees infested by nematodes could benefit from application of nematicides. M.T.F.

220 URTIAGA M., R. [Report of the section for pests and diseases.] Informe de la seccion de plagas y enfermedades. In *Informe anual para la asamblea ejercicio del 1-9-1971 al 31-8-1972*. Barquisimeto, Venezuela: Instituto para el Fomento de la Productividad Azucarera. (1972) Section C, 45 pp. [Es, Plant nematology p. 43 + 1 table.]

A survey of sugar-cane roots, soil and associated weeds in Venezuela, showed that *Aphelenchus avenae, Aphelenchoides bicaudatus, Helicotylenchus dihystera* and *Pratylenchus zeae* were the most common. *Macroposthonia* spp., *Meloidogyne incognita* and *Tylenchus* spp. were also common. PSG

221—YEPEZ T., G.; MEREDITH, J. A.; PEREZ, A., 1972. "Banana and plantain (*Musa* spp.) nematodes in Venezuela." [Abstract] *Nematropica*, 2 (1), 11, 24–25. [En, Es] Sección de Nematología, Inst. de Zoología Agrícola, Univ. Central de Venezuela, Maracay, Venezuela.

222 YÉPEZ, T., G.; MEREDITH, J. A.; PÉREZ, A. [Nematodes of bananas and plantain (*Musa* sp.) in Venezuela.] Nematodos de banano y plátano (*Musa* sp.) en Venezuela. *Nematropica* (1972) 2 (2) 47-51 [Es, en] Sección de Nematología, Inst. de Zoología Agrícola, Fac. de Agronomía, Univ. Cent. de Venezuela, Maracay, Venezuela.

223 EDWARDS, D. I.; WEHUNT, E. J. Hosts of *Pratylenchus coffeae* with additions from Central American banana-producing areas. *Plant Disease Reporter* (1973) 57 (1) 47-51 [En] Vining C. Dunlap Laboratories, Tela Railroad Company, La Lima, Honduras, Central America.

Populations of *Pratylenchus coffeae* from plantain [*Musa paradisiaca*] in Honduras and from abaca, *Musa textilis*, in Panama were tested on 47 plant species. 26 of the plants were hosts, of which 18 are new records. In the Panama tests, 5 of 38 were hosts while in Honduras all 21 tested plants were hosts. 12 of the hosts of the plantain population in Honduras were not hosts of the abaca population in Panama, indicating physiological races in *P. coffeae*. A list of the 154 recorded hosts of *P. coffeae*, with literature references, is given. MTF

224 SINGH, N. D.; FARRELL, K. M. *Pratylenchus penetrans*, a nematode pest new to Trinidad, West Indies. *Plant Disease Reporter* (1973) 57 (3) 260 [En] Dept. of Crop Science, Univ. of the West Indies, St. Augustine, Trinidad.

Pratylenchus penetrans occurring in large numbers in mixed populations with *Meloidogyne incognita* was isolated from processed soil and roots of stunted tobacco plants with prematurely yellowed leaves and brown root lesions at Chaguanas, Trinidad. This is believed to be the first report of *P. penetrans* in Trinidad. KJOW

ADDENDUM

120a AYALA, A. (Nematode problems in Puerto Rican Agriculture.) *Proceedings of the Symposium on Tropical Nematology, University of Puerto Rico, July 1969,* 135-144.

General report of the nematological studies in Puerto Rico from the beginning to the present with details of crop infection and control.

121a BARRIGA OLIVARES, R. (Nematode Problems in Columbia) *Proceedings of the Symposium on Tropical Nematology, University of Puerto Rico, July 1969,* 107-111.

Report of nematological studies on some of the most important crops of Colombia.

124a EDMUNDS, J.E. (Nematological research in the British West Indies.) *Proceedings of the Symposium on Tropical Nematology, University of Puerto Rico, July 1969,* 112-119.

An account of nematological investigations in the British West Indies carried out from its inception in the early part of the 20th century to the present.

126a JENKINS, W.R. (Nematodes associated with lemongrass in Guatemala.) *Proceedings of the Symposium on Tropical Nematology, University of Puerto Rico, July 1969,* 80-83.

Lemongrass *(Cybopogon citratus)* grown in Guatemala has been found in the past several years to have a significantly reduced yield of citral, the essential oil for which it is grown. On examination the plants showed sparse root development associated with high populations of nematodes, principally *Criconemoides* and *Pratylenchus*. Other genera found were *Meloidogyne, Hoplolaimus, Helicotylenchus,* and *Xiphinema*. Associated with the high nematode populations was the fungus *Fusarium* which appeared to have established itself due to the weakened condition of the roots.

134a SMITH, L.R. & THAMES, W.H. (Plantain nematodes and preliminary crop-rotation studies for their control in the Dominican Republic.) *Proceedings of the Symposium on Tropical Nematology, University of Puerto Rico, July 1969,* 84-88.

Studies relating to the control of nematodes parasitic on plantain, in the Cibao region of the Dominican Republic, were undertaken to observe the effect of various crop rotations on the recovery of *Meloidogyne* sp., *Pratylenchus* sp., *Helicotylenchus* sp., and *Radopholus* sp., from inoculated soil, and to determine whether any locally grown crops of cash-income value would serve to eliminate the latter species from infested soils within a relatively short period of time.

Abaca, Pratylenchus coffeae on 223.

Abelmoschus esculentus, Rotylenchulus reniformis on 218.

Acrobeles undulatus n.sp. in Venezuela 68.

Acrobeloides buetschlii on Saccharum officinarum in Cuba 176.

Acrobeloides cubaensis in soil in Mexico 47.

Acrobeloides tlaxcalensis n.sp. in soil in Mexico 47.

Actinocephalus bizarrus n.sp. in Puerto Rico 102.

Agmodorus aberrans n.g., n.sp. in Puerto Rico 76.

Alainus striatus n.sp. in Venezuela 68.

Allium cepa,

Ditylenchus dipsaci on 46.

Helicotylenchus erythrinae on 202.

Rotylenchulus reniformis on 202.

Allium fistulosum, Meloidogyne sp. on 191.

Allium sativum, Ditylenchus dipsaci on 160.

Ananas comosus,

Criconema on 204.

Criconemoides on 91, 161.

Helicotylenchus on 45, 91, 161, 204.

Helicotylenchus sp. on 103.

Helicotylenchus labiatus n.sp. on 79.

Heterodera marioni on 19.

Longidorus on 204.

Meloidogyne on 45, 204.

Meloidogyne incognita on 91, 103, 161.

nematodes on 45.

Pratylenchus on 19, 204.

Rotylenchulus reniformis on 91, 103.

Rotylenchus on 19, 45.

Xiphinema on 204.

Ananas sativus,

Peltamigratus browni n.sp. on 111.

Peltamigratus luci n.sp. on 71.

Andropogon, nematodes on 175.

Anguillulina similis on *Saccharum officinarum* in Colombia, control, pathogenicity 1

Anthurium acaule, *Radopholus similis* on 58.

Antirrhinum, *Heterodera marioni* on 8.

Aphelenchoides

on *Saccharum officinarum* in Puerto Rico 28.

on *Solanum tuberosum* in Colombia 132.

Aphelenchoides sp. on *Coffea* in Venezuela 126.

Aphelenchoides bicaudatus

on *Coffea* in Guatemala 41.

on *Saccharum officinarum* in Venezuela 220.

on weeds in Venezuela 220.

Aphelenchoides cocophilus

see also *Rhadinaphelenchus cocophilus*

on *Cocos nucifera* in Central America 42.

in Mexico 25.

in Panama 39.

in St. Vincent 26.

in Trinidad 34.

in Trinidad & Tobago 29, 33.

in Venezuela 17.

Aphelenchoides coffeae on *Coffea* in Guatemala 41.

Aphelenchoides heterophallus n.sp. on *Saccharum officinarum* in Jamaica 4.

Aphelenchoides hodsoni in soil in Mexico 47.

Aphelenchoides oryzae on *Oryza sativa* in Panama 39.

Aphelenchoides ritzemabosi

on *Chrysanthemum multifolium* in Bermuda 6.

on *Salvia farinacea* in Bermuda, new record (h.) 60.

Aphelenchus

on crops in Panama 156.

on *Oryza sativa* in Guyana 146.

on *Saccharum officinarum* in Puerto Rico 28.

Aphelenchus avenae

on *Coffea* in Penezuela 126.

on *Saccharum officinarum* in Venezuela 220.

in Venezuela 142.

on weeds in Venezuela 220.

Apium graveolens, *Heterodera marioni* on 6.

Arachis hypogaea, *Meloidogyne* sp. on 39.

Axonchium amphidium n.sp. in Puerto Rico 76.

Axonchium amplicolle in Puerto Rico 76.

Axonchium arcuatum n.sp. in Puerto Rico 76.

Axonchium baldum n.sp. in Puerto Rico 76.

Axonchium rotundum n.sp. in Puerto Rico 76.

Barbados,

nematodes, free-living 205.

nematodes, plant-parasitic 205.

Bastiania on crops in Venezuela 137.

Belondira cylindrica n.sp. in Puerto Rico 76.

Belondira parva n.sp. in Puerto Rico 76.

Belondira porta n.sp. in Puerto Rico 76.

Belondira sacca n.sp. in Puerto Rico 76.

Belondira tenuidens n.sp. in Puerto Rico 76.

Belondirella teres n.g., n.sp. in Puerto Rico 76.

Belondiroidea n.superf. in Puerto Rico 76.

Belonenchidae n.fam. in Puerto Rico 76.

Belonenchus penetrans n.g., n.sp. in Puerto Rico 76.

Belonolaimus lineatus n.sp. on Saccharum officinarum in Puerto Rico 70.

Belonolaimus lineatus on Saccharum officinarum in Puerto Rico, control by D-D 114.

Belonolaimus longicaudatus

on Citrus in Bermuda 60.

on vegetables in Puerto Rico, control by nematicides 104.

Bermuda,

Aphelenchoides ritzemabosi 6, 60.

Belonolaimus longicaudatus 60.

Helicotylenchus spp. 60.

Helicotylenchus erythrinae 60.

Heterodera marioni 6.

Meloidogyne incognita 60.

Rotylenchulus reniformis 60.

Tylenchulus semipenetrans 60.

Xiphinema americanum 60.

Beta vulgaris, nematodes on 31.

Bibliography,

nematodes, plant-parasitic 27.

Rotylenchus reniformis 64.

Black head disease on Musa sp. in Jamaica 66.

Brassica oleracea, Radopholus similis on 84.

Brassica oleracea capitata,

Heterodera marioni on 8.

Meloidogyne sp. on 20.

nematodes on 31.

British Guiana, Rhadinaphelenchus cocophilus 54.

British Honduras,

Criconemoides 157.

Dorylaimus 157.

Longidorus 157.

Tylenchulus semipenetrans 157.

Xiphinema 157.

Brittonema fusiformum n.sp. in Puerto Rico 102.

Brittonema spicatum n.sp. in Puerto Rico 102.

Brittonema sulcatum n.sp. in Puerto Rico 102.

Bursaphelenchus digitulus n.sp. in Venezuela 68.

Bursaphelenchus gonzalezi n.sp. in Venezuela 68.

Cajanus cajan,

Meloidogyne on 140.

Meloidogyne spp. on 72.

Meloidogyne javanica on 53.

Rotylenchulus reniformis on 164, 218.

Caladium,

Heterodera sp. on 50.

Meloidogyne arenaria on 50.

Capsicum see also pepper

Capsicum spp., Meloidogyne sp. on 39.

Capsicum frutescens,

Helicotylenchus erythrinae on 202.

Meloidogyne sp. on 191.

Meloidogyne incognita on 202.

Rotylenchulus reniformis on 191, 202.

Carcharoides tigrodon n.g., n.sp. in Puerto Rico 102.

Carcharolaimus aberrans n.sp. in Puerto Rico 102.

Carcharolaimus discus n.sp. in Puerto Rico 102.

Carcharolaimus drepanodon n.sp. in Venezuela 68.

Carcharolaimus pizae n.sp. in soil in São Paulo 21.

Carcharolaimus ramirezi n.sp. in Puerto Rico 102.

Caribenema ferox n.g., n.sp. in Puerto Rico 102.

Caribenema longidens n.sp. in Puerto Rico 102.

Carica gracilis,

Helicotylenchus spp. on 218.

Meloidogyne sp. on 218.

Rotylenchulus reniformis on 218.

Carica papaya,

Meloidogyne incognita on 163.

nematodes on 123.

Rotylenchulus reniformis on 83, 163.

Central America,

Aphelenchoides cocophilus 42.

Helicotylenchus sp. 42.

Heterodera marioni 22.

Meloidogyne exigua 42.

Meloidogyne incognita 42.

nematodes on *Coffea* 115.

Peltamigratus thornei n.sp. 128.

Pratylenchus spp. 42.

Radopholus similis 173.

Cercospora & nematodes on *Musa* sp. 11.

Chronogaster daoi n.sp. in Venezuela 68.

Chrysanthemum frutescens, *Meloidogyne hapla* on 207.

Chrysanthemum multifolium, *Aphelenchoides ritzemabosi* on 6.

Cinchona micrantha, *Meloidogyne incognita* on 16.

Cinchona succirbura, *Meloidogyne incognita* on 16.

Citrullus vulgaris, *Meloidogyne* sp. on 39.

Citrus,

Belonolaimus longicaudatus on 60.

Criconemoides on 157.

Dorylaimus on 157.

Helicotylenchus spp. on 101.

Longidorus on 101, 157.

Macroposthonia denoudeni n.sp. on 95.

Meloidogyne exigua on 134.

nematodes on 73.

Radopholus sp. on 43.

Radopholus similis on 30, 192.

Tylenchulus semipenetrans on 59, 60, 74, 134, 157, 160, 192.

Tylenchus spp. on 101.

Xiphinema on 101, 157.

Xiphinema basiri on 73, 74.

Xiphinema denoudeni n.sp. on 214.

Xiphinema imambaksi n.sp. on 214.

Citrus sp.,

Tylenchulus semipenetrans on 86.

Xiphinema surinamense n.sp. on 214.

Cobbonatus on crops in Venezuela 137.

Cocos nucifera,

Aphelenchoides cocophilus on 17, 25, 26, 29, 33, 34, 39, 42.

Encholaimus taurus n.sp., n.sp. on 89.

Peltamigratus thornei n.sp. on 128.

red ring disease on 125.

Rhadinaphelenchus cocophilus on 54, 57, 62, 90, 105, 109, 110, 124, 129, 136, 146, 158, 160, 177, 188, 193, 196, 216.

Rotylenchulus n.sp. [not described] on 59.

Coffea,

Aphelenchoides sp. on 126.

Aphelenchoides bicaudatus on 41.

Aphelenchoides coffeae on 41.

Aphelenchus avenae on 126.

Criconemoides sp. on 126.

Ditylenchus procerus on 41.

Helicotylenchus sp. on 126.

Helicotylenchus erythrinae on 41, 126.

Macroposthonia denoudeni n.sp. on 95.

Meloidogyne spp. on 41, 56, 160.

Meloidogyne arenaria on 59.

Meloidogyne exigua on 21, 41, 42, 44, 126, 133, 145, 187, 192.

Meloidogyne incognita on 41.

nematodes on 40, 41, 115, 120, 123, 126.

Pratylenchus spp. on 56.

Pratylenchus coffeae on 41, 44, 59, 126, 133, 145, 187.

Radopholus similis on 189.

Xiphinema americanum on 56, 187.

Coffea arabica,

Meloidogyne sp. on 39.

Radopholus similis on 58, 84.

Coffea liberica, *Gracilacus peperpotti* n.sp. on 63.

Coffea robusta,

Meloidogyne exigua on 87.

Pratylenchus coffeae on 87.

Colocasia esculenta,

Meloidogyne sp. on 197.

Meloidogyne incognita on 198.

Colombia,

Anguillulina similis 10.

Aphelenchoides 132.

Criconemoides 132.

Ditylenchus 132.

Helicotylenchus 150, 166.

Heterodera 132.

Heterodera marioni 13, 15, 18, 24.

Heterodera rostochiensis 195.

Meloidogyne 122, 132, 150, 166.

Meloidogyne sp. 32.

Meloidogyne spp. 167.

Meloidogyne exigua 21.

Meloidogyne hapla 207.

nematodes on *Lycopersicon esculentum* 131, 165.

Phaseolus vulgaris 131.

Pratylenchus 150.

Rhadinaphelenchus cocophilus 158, 193, 196.

Rotylenchulus 132, 150.

Rotylenchulus reniformis 166.

Rotylenchus 132.

Trichodorus 132.

Tylenchorhynchus 132, 150.

Tylenchulus 132.

Xiphinema 132.

Commelina,

Radopholus similis on 159.

Rotylenchulus sp. on 139.

Rotylenchulus reniformis on 159.

Commelina sp.,

Rotylenchulus sp. on 171.

Rotylenchulus reniformis on 170.

Control,

Anguillulina similis 10.

Belonolaimus lineatus 114.

Belonolaimus longicaudatus 104.

Criconemoides 49, 91, 161.

Helicotylenchus 49, 78, 91, 150, 161.

Helicotylenchus sp. 103, 139.

Helicotylenchus spp. 114.

Helicotylenchus erythrinae 219.

Helicotylenchus multicinctus 80, 81, 92, 129, 180.

Hemicroconemoides 49.

Heterodera marioni 8, 13, 18, 24.

Hoplolaimus galeatus 219.

Meloidogyne 49, 78, 122, 127, 150, 162, 200.

Meloidogyne sp. 37.

Meloidogyne spp. 56, 98, 114, 167.

Meloidogyne incognita 91, 103, 161, 163.

nematodes on *Coffea* 115.

crops 140.

Dioscorea 208.

Lycopersicon esculentum 12, 131.

Musa sp. 11, 96, 135, 172, 180.

pepper 186.

Phaseolus vulgaris 131.

Saccharum officinarum 38.

vegetables 215.

Pratylenchus 49, 78, 150.

Pratylenchus sp. 151.

Pratylenchus spp. 56.

Pratylenchus coffeae 162.

Pratylenchus thornei 152.

Radopholus similis 58, 80, 81, 92, 116, 129, 159, 180, 199.

Rhadinaphelenchus cocophilus 109, 110, 129, 158, 177, 196.

Rotylenchulus 150.

Rotylenchulus sp. 139, 144.

Rotylenchulus reniformis 91, 103, 159, 163, 164.

Rotylenchus 49.

Scutellonema blaberum 162.

Scutellonema bradys 94, 162.

Trichodorus christiei 104.

Tylenchorhynchus 49, 150.

Xiphinema americanum 56.

Control methods,

crop rotation 12, 24, 91, 103, 131, 150, 161.

cultivation 38.

fallowing 144.

fertilizers 115.

flood fallowing 129.

hot-water treatment 80, 92, 143, 208.

killing infected trees 196.

warm-water treatment 162.

Costa Rica,

Helicotylenchus spp. 101.

Helicotylenchus erythrinae 219.

Hoplolaimus galeatus 219.

Hysoperine n.sp. 174.

Longidorus 101.

Meloidogyne incognita acrita 23.

nematodes on *Musa* sp. 206.

Peltamigratus holdemani n.sp. 71.

Pratylenchus musicola 23.

Radopholus similis 23, 189, 209, 210.

Tylenchus spp. 101.

Xiphinema 101.

Criconema

on *Ananas comosus* in Mexico 204.

on *Saccharum officinarum* in Puerto Rico 114.

Criconemoides n.sp. [not named or described] on *Dioscorea* sp. in Guatemala 55.

Criconemoides

on *Ananas comosus* in Puerto Rico, control by crop rotation 91, 161.

on *Citrus* in British Honduras 157.

on *Oryza sativa* in Guyana 146.

on *Saccharum officinarum* in Puerto Rico 28.

control by DBCP 49.

on *Solanum tuberosum* in Colombia 132.

Criconemoides sp. on *Coffea* in Venezuela 126.

Criconemoides spp. on *Saccharum officinarum* in Puerto Rico 114.

Criconemoides oostenbrinki n.sp. in Venezuela 68.

Criconemoides xenoplax on *Vitis* in Mexico 118.

Crotalaria striata, nematodes on 31.

Cryptonchus on crops in Venezuela 137.

Cuba,

Acrobeloides buetschlii 176.

Ditylenchus 36.

Ditylenchus intermedius 176.

Ditylenchus triformis 176.

Dorylaimus limnophilus 175.

Helicotylenchus 36.

Helicotylenchus multicinctus 80, 81, 92, 99, 100.

Meloidogyne 82.

Meloidogyne sp. 100.

Meloidogyne incognita 99.

nematodes on *Andropogon* 175.

on *Digitaria* 175.

on *Echinochloa* 175.

on *Eleusine* 175.

plant-parasitic 85.

on *Saccharum officinarum* 36, 97.

Panagrolaimus hygrophilus 175.

Pratylenchus zeae 175, 176.

Radopholus similis 80, 81, 84, 92, 99, 143.

Rotylenchulus reniformis 83, 99, 100.

Rotylenchus coffeae 99.

Scutellonema bradys 94.

Cucumis melo,

Meloidogyne sp. on 39.

Rotylenchulus reniformis on 83.

Cucumis sativus,

Heterodera marioni on 6, 8.

Meloidogyne sp. on 39.

Rotylenchulus reniformis on 83.

Cylindrocorpus curzii zamithi n.subsp. in soil in São Paulo 21.

Cynodon dactylon, *Helicotylenchus* spp. on 60.

Dahlia spp., *Meloidogyne* sp. on 20.

Daucus carota,

Helicotylenchus erythrinae on 202.

Heterodera marioni on 6.

nematodes on 31.

Rotylenchulus reniformis on 202.

Desmoscolex in soil in Guatemala 88.

Development,

Helicotylenchus multicinctus 81.

Radopholus similis 81.

Dianthus spp., *Meloidogyne* sp. on 20.

Digitaria, nematodes on 175.

Dioscorea,

nematodes on 208.

Scutellonema sp. on 156.

Dioscorea sp.,

Criconemoides n.sp. [not named or described] on 55.

Hoplolaimus bradys n.sp. on 3.

Meloidogyne incognita incognita on 55.

Pratylenchus brachyurus on 55.

Dioscorea spp.,

Heterodera sp. on 50.

Meloidogyne arenaria on 50.

Meloidogyne incognita on 50, 51.

Dioscorea alata,

Meloidogyne on 162.

Pratylenchus coffeae on 162.

Scutellonema blaberum on 162.

Scutellonema bradys on 94, 162.

Dioscorea trifida, *Meloidogyne* sp. on 197.

Discocriconemella surinamensis n.sp. in soil in Surinam 147.

Discolaimus affinis n.sp. in Venezuela 68.

Discolaimus mucurubanus n.sp. in Venezuela 68.

Ditylenchus

on crops in Venezuela, pathology 137.

on *Saccharum officinarum* in Cuba 36.

in Puerto Rico 114.

on *Solanum tuberosum* in Colombia 132.

Ditylenchus spp.

on *Saccharum officinarum* in Puerto Rico 28.

in Venezuela 142.

Ditylenchus dipsaci

on *Allium cepa* in Venezuela 46.

on *Allium sativum* in Venezuela 160.

on *Medicago sativa* in Mexico 192.

Ditylenchus intermedius on *Saccharum officinarum* in Cuba 176.

Ditylenchus procerus on *Coffea* in Guatemala 41.

Ditylenchus triformis on *Saccharum officinarum* in Cuba 176.

Dominica,

Meloidogyne exigua 133.

nematodes on *Musa* sp. 106.

Pratylenchus coffeae 133.

Dorylaimellus longicollis n.sp. in Venezuela 68.

Dorylaimellus nygellurus n.sp. in Venezuela 68.

Dorylaimellus spicatus n.sp. in Venezuela 68.

Dorylaimoides brevidens n.sp. in Puerto Rico 76.

Dorylaimoides intermedius n.sp. in Puerto Rico 76.

Dorylaimoides porifer n.sp. in Venezuela 68.

Dorylaimoides reversus n.sp. in Puerto Rico 76.

Dorylaimoides similis n.sp. in Puerto Rico 76.

Dorylaimus on *Citrus* in British Honduras 157.

Dorylaimus limnophilus on *Oryza sativa* in Cuba 175.

Dorylalusimel clavatus n.sp. in Puerto Rico 76.

Dorylalusimel filicaudatus n.sp. in Puerto Rico 76.

Dorylalusimel labiatus n.sp. in Puerto Rico 76.

Doryllium flangum n.sp. in Puerto Rico 76.

Doryllium longicaudatum n.sp. in Venezuela 68.

Doryllium nudum n.sp. in Puerto Rico 76.

Doryschota apitica n.g., n.sp. in Puerto Rico 76.

Drepanodorus orthodon n.sp. in Venezuela 68.

Echinochloa, nematodes on 175.

Economic loss,

Meloidogyne sp. 121.

Meloidogyne exigua 121.

Meloidogyne incognita 121.

Meloidogyne javanica 121.

nematodes on *Lycopersicon esculentum* 201.

Egtitus bryophilus n.sp., n.sp. in Puerto Rico 102.

Elaeis guineansis, *Xiphinema filicaudatum* n.sp. on 214.

Eleusine, nematodes on 175

El Salvador, *Pratylenchus coffeae* 145.

Encholaimus taurus n.g., n.sp. on *Cocos nucifera* in Trinidad 89.

Espeletia sp. & *Tylencholaimus maritus* n.sp. in Venezuela 113.

Eucephalobus pulcher n.sp. in Venezuela 68.

Eudorylaimus morbidus n.sp. in Venezuela 68.

French Antilles,

nematodes 212.

on crops 211.

Fusarium & Trichodorus on Saccharum officinarum 213.

Fusarium spp. & Trichodorus christiei on Saccharum officinarum 179.

Glycine max,

Meloidogyne sp. on 20.

Rotylenchulus reniformis on 83.

Gossypium hirsutum, Radopholus similis on 84.

Gossypium hirsutum punctatum, Radopholus similis on 58.

Gracilacus on fruit crops in Panama 156.

Gracilacus peperpotti n.sp. on Coffea liberica in Surinam 63.

Guadelpoupe,

Longidorus laevicapitatus 93.

nematodes on Musa sp. 11.

Guatemala,

Aphelenchoides bicaudatus 41.

Aphelenchoides coffeae 41.

Criconemoides n.sp. [not named or described] 55.

Desmoscolex 88.

Ditylenchus procerus 41.

Helicotylenchus erythrinae 41.

Heterodera sp. 50.

Meloidogyne spp. 41, 56.

Meloidogyne arenaria 50.

Meloidogyne exigua on 41, 44, 87, 145, 187.

Meloidogyne incognita 16, 41, 50, 51, 55.

Meloidogyne incognita acrita 52.

nematodes on *Coffea* 40, 41.

Pratylenchus spp. 56.

Pratylenchus brachyurus 55.

Pratylenchus coffeae 41, 44, 87, 187.

Xiphinema americanum 56, 187.

Guyana,

Aphelenchus 146.

Criconemoides 146.

Helicotylenchus 146, 217.

Hemicycliophora 146.

Meloidogyne 217.

Meloidogyne spp. 146.

nematodes on *Carica papaya* 123.

on *Coffea* 123.

on *Hibiscus cannabinus* 123.

on *Lycopersicon esculentum* 123.

on *Musa* sp. 123.

on *Nicotiana tabacum* 123.

on *Oryza sativa* 123.

on *Piper nigrum* 123.

on *Saccharum officinarum* 123.

on *Zingiber officinale* 123.

Psilenchus 146.

Rhadinaphelenchus cocophilus 146, 188.

Rotylenchus 146, 217.

Tylenchorhynchus 217.

Tylenchus 146, 217.

Heliconia aurantiaca, *Radopholus similis* on 58.

Helicotylenchus

on *Ananas comosus* in Mexico 204.

in Puerto Rico 45.

control by crop rotation 91, 161.

on crops in Colombia, control by crop rotation 150.

in Guyana 217.

in Panama 156.

in Venezuela, pathology 137

on *Lycopersicon esculentum* in Colombia 166.

on *Oryza sativa* in Guyana 146.

on *Saccharum officinarum* in Cuba 36.

in Puerto Rico, control by DBCP 49.

control by nematicides 78.

on *Zea mays* in Mexico 192.

Helicotylenchus sp.

on *Ananas comosus* in Puerto Rico, control by crop rotation 103.

control by nematicides 103

on *Coffea* in Venezuela 126.

on crops in Panama 39.

on *Nicotiana tabacum* in Central America 42.

in Panama 35.

on weeds in Windward Islands, control by nematicides 139.

Helicotylenchus spp.

on *Carica gracilis* in Trinidad 218.

on *Citrus* in Costa Rica 101.

in Panama 101.

on *Cynodon dactylon* in Bermuda 60.

on *Musa* sp. in French West Indies 134.

in Surinam 136.

on Saccharum officinarum in Puerto Rico 28.

control by nematicides 144.

Helicotylenchus apiculus n.sp.

in forest soil in Puerto Rico 79.

on Saccharium officinarum in Puerto Rico 79.

Helicotylenchus borinquensis n.sp. on Saccharum officinarum in Puerto Rico 79.

Helicotylenchus caribensis n.sp. on Saccharum officinarum in Puerto Rico 79.

Helicotylenchus concavus n.sp. on Saccharum officinarum in Puerto Rico 48.

Helicotylenchus curvatus n.sp. on Saccharum officinarum in Puerto Rico 79.

Helicotylenchus dihystera

on crops in Panama 190.

on plants in Puerto Rico 73.

on Saccharum officinarum in Venezuela 220.

on vegetables in Panama 191.

in Venezuela 142.

on weeds in Venezuela 220.

Helicotylenchus elegans n.sp. on Saccharum officinarum in Puerto Rico 79.

Helicotylenchus erythrinae

on Allium cepa in Venezuela 202.

on Capsicum frutescens in Venezuela 202.

on Coffea in Guatemala 41.

in Venezuela 126.

on Daucus carota in Venezuela 202.

on Lycopersicon esculentum in Venezuela 202.

on marigold in Venezuela 202.

in soil in Bermuda 60.

on sorghum in Venezuela 202.

on Theobroma cacao in Costa Rica, control by nematicides 219.

on Zea mays in Venezuela 202.

Helicotylenchus flatus n.sp. on Persea americana in Puerto Rico 79.

Helicotylenchus labiatus n.sp. on *Ananas comosus* in Puerto Rico 79.

Helicotylenchus microcephalus

on crops in Panama 190.

on vegetables in Panama 191.

Helicotylenchus multicinctus on *Musa* sp. in Cuba 99.

control by DBCP 92.

control by hot water 80, 92.

control by nematicides 80.

control reviewed 81.

development 81.

life-history 81.

morphology 81.

in Surinam, control 180.

control by flood fallowing 129.

pathology 180.

in Windward Islands 108, 124.

on plants in Cuba 100.

Helicotylenchus nannus on ornamentals in Puerto Rico 58.

Helicotylenchus spicaudatus n.sp. in Puerto Rico 75.

Helicotylenchus thornei n.sp. on mosses in Puerto Rico 79.

Helicotylenchus tropicus n.sp. on palm in Puerto Rico 79.

Helicotylenchus truncatus n.sp. on *Saccharum officinarum* in Puerto Rico 79.

Hemicriconemoides on *Saccharum officinarum* in Puerto Rico, control by DBCP 49.

Hemicriconemoides spp. on *Saccharum officinarum* in Puerto Rico 114.

Hemicycliophora

on *Oryza sativa* in Guyana 146.

on *Saccharum officinarum* in Puerto Rico 114.

Heterodera

on crops in Venezuela 137.

on *Solanum tuberosum* in Colombia 132.

Heterodera sp.

on *Caladium* in Guatemala 50.

on *Dioscorea* spp. in Guatemala 50.

on *Solanum aviculare* in Guatemala 50.

on *Solanum rostratum* in Mexico 65.

Heterodera marioni

on *Ananas comosus* in Mexico 19.

on *Antirrhinum* in Jamaica, control 8.

on *Apium graveolens* in Bermuda 6.

on *Brassica oleracea capitata* in Jamaica, control 8.

on crops in Colombia, control by crop rotation 24.

control by nematicides 24.

on *Cucumis sativus* in Bermuda 6.

in Jamaica, control 8.

on *Daucus carota* in Bermuda 6.

on *Humulus lupulus* in Colombia 15.

on *Lactuca sativa* in Jamaica, control 8.

on *Lycopersicon esculentum* in Central America 22.

in Colombia, control by crop rotation 24.

control by D-D 13.

control by nematicides 24.

in Jamaica, control 8.

on *Musa paradisiaca* in Colombia, control, life-history 18.

on *Nicotiana tabacum* in Colombia, control by crop rotation & nematicides 24.

in Puerto Rico 9.

on *Solanum melongena* in Jamaica, control 8.

on vegetables in Central America 22.

in Trinidad 14.

on weeds in Mexico 19.

Heterodera mexicana n.sp. on *Solanum rostratum* in Mexico 107.

Heterodera punctata on Zea mays in Mexico 192.

Heterodera radicicola on Lycopersicon esculentum in Trinidad 1.

Heterodera rostochiensis

in soil in Colombia 195.

on Solanum tuberosum in Panama 112, 117.

in Venezuela 169, 182.

in Venezuela, distribution 168.

Hibiscus cannabinus,

Meloidogyne incognita acrita on 52.

nematodes on 123.

Hibiscus esculentus, Radopholus similis on 84.

Hirschmanniella on Oryza sativa in Mexico 192.

Hirschmanniella sp. on Oryza sativa in Panama 156.

Hirschmanniella oryzae on Oryza sativa in Venezuela 160.

Hirschmanniella spinicaudata on Oryza sativa in Venezuela 160.

Honduras,

Meloidogyne incognita acrita 23.

Pratylenchus coffeae 194, 223.

Pratylenchus musicola 23.

Radopholus similis 23.

Hoplolaimus on Saccharum officinarum in Puerto Rico 114.

Hoplolaimus spp. on Saccharum officinarum in Puerto Rico 28.

Hoplolaimus bradys n.sp. on Dioscorea sp. in Jamaica 3.

Hoplolaimus galeatus on Theobroma cacao in Costa Rica, control by nematicides 219

Hoplolaimus puertoricensis n.sp. in Saccharum officinarum in Puerto Rico 69.

Humulus lupulus, Heterodera marioni on 15.

Hysoperine n.sp. [not named] on Oryza sativa in Costa Rica 174.

Ipomoea batatas,

Meloidogyne sp. on 197.

Rotylenchulus reniformis on 83, 197.

Tylenchorhynchus sp. on 197.

Jamaica,

Aphelenchoides heterophallus n.sp. 4.

black head disease 66.

Heterodera marioni 8.

Hoplolaimus bradys n.sp. 3.

Meloidogyne arenaria 59.

nematodes on Dioscorea 208.

on fruit trees 67.

on Lycopersicon esculentum 12.

on Musa sp. 96.

Pathoaphelenchus spp. 2.

Pratylenchus coffeae 59.

Radopholus sp. 43.

Radopholus similis 30, 43, 59, 96, 199.

Rotylenchulus n.sp. [not described] 59.

Scapidens perplexus n.g., n.sp. 77.

Tylenchulus semipenetrans 59.

Lactuca sativa,

Heterodera marioni on 8.

Meloidogyne on 127.

Xiphinema on 140.

Leptonchidae in Puerto Rico 76.

Leptonchus granulosus in Puerto Rico 76.

Life-history,

Helicotylenchus multicinctus 81.

Heterodera marioni 18.

Meloidogyne 82.

Meloidogyne sp. 37.

Radopholus similis 81.

Longidorus

on Ananas comosus in Mexico 204.

on Citrus in British Honduras 157.

in Costa Rica 101.

in Panama 101.

on Saccharum officinarum in Puerto Rico 28, 114.

Longidorus laevicapitatus

on Saccharum officinarum in French West Indies 134.

in Guadeloupe, morphology 93.

Lycopersicon esculentum,

Helicotylenchus on 166.

Helicotylenchus erythrinae on 202.

Heterodera marioni on 8, 13, 22, 24

Heterodera radicicola on 1.

Meloidogyne on 166, 200.

Meloidogyne sp. on 20, 33, 37.

Meloidogyne spp. on 155, 160, 167, 183.

Meloidogyne incognita on 61.

nematodes on 12, 31, 123, 131, 165, 201.

Rotylenchulus reniformis on 61, 83, 166, 202.

Macroposthonia spp.

on Saccharum officinarum in Venezuela 220.

on weeds in Venezuela 220.

Macroposthonia denoudeni n.sp.

on Citrus in Surinam 95.

on Coffea in Surinam 95.

Macroposthonia longistyleta n.sp. in soil in Surinam 147.

Macroposthonia peruensiformis n.sp. on Solanum tuberosum in Surinam 95.

Manihot esculenta,

Meloidogyne sp. on 197.

nematodes on 140.

Marigold,

Helicotylenchus erythrinae on 202.

Rotylenchulus reniformis on 202.

Martinique, Peltamigratus luci n.sp. 71.

Medicago sativa, Ditylenchus dipsaci on 192.

Meloidogyne

on Ananas comosus in Mexico 204.

in Puerto Rico 45.

on Cajanus cajan in West Indies 140.

on crops in Colombia, control by crop rotation 150.

in Cuba, life-history 82.

in Guyana 217.

in Panama 156.

in Venezuela, pathology 137.

on Dioscorea alata in Puerto Rico, control by nematicides & warm water 162.
on Lactuca sativa in Trinidad, control by nematicides 127.
on Lycopersicon esculentum in Colombia 166.
in Puerto Rico, control by nematicides 200.
on Nicotiana tabacum in Colombia, control by nematicides 122.
in Venezuela 130.
on Saccharum officinarum in Puerto Rico, control by DBCP 49.
control by nematicides 78.
on Solanum tuberosum in Colombia 132.
Meloidogyne sp.
on Allium fistulosum in Panama 191.
on Arachis hypogaea in Panama 39.
on Brassica oleracea capitata in Venezuela 20.
on Capsicum spp. in Panama 39.
on Capsicum frutescens in Panama 191.
on Carica gracilis in Trinidad 218.
on Citrullus vulgaris in Panama 39.
on Coffea arabica in Panama 39.
on Colocasia esculenta in Trinidad 197.
on crops in Panama 190.
in Trinidad, economic loss 121.
on Cucumis melo in Panama 39.
on Cucumis sativus in Panama 39.
on Dahlia spp. in Venezuela 20.
on Dianthus spp. in Venezuela 20.
on Dioscorea trifida in Trinidad 197.
on Glycine max in Venezuela 20.
on Ipomoea batatas in Trinidad 197.
on Lycopersicon esculentum in Mexico, control by nematicides 37.
life-history, morphology 37.

in Trinidad & Tobago 33.

in Venezuela 20.

on Manihot esculenta in Trinidad 197.

on Musa sp. in Dominica, crop rotation 134a.

in Panama 39.

on Nicotiana tabacum in Colombia 32.

in Venezuela 20.

on plants in Cuba 100.

on Solanum tuberosum in Venezuela 20.

on vegetables in Windward Islands 124.

on Vigna sinensis in Panama 39.

on weeds in Trinidad, economic loss 121.

on Xanthosoma sagittifolium in Trinidad 197.

Meloidogyne spp.

on Cajanus cajan in Puerto Rico, resistance 72.

on Coffea in Guatemala 41.

control by D-D 56.

in Venezuela 160.

on Lycopersicon esculentum in Colombia, control by nematicides 167.

in Mexico 155.

resistant varieties 183.

in Venezuela 160.

in Nicotiana tabacum in Venezuela 160.

on Saccharum officinarum in Puerto Rico, control by D-D 98.

control by nematicides 114.

in soil in Guyana 146.

on Spathodea campanulata in Puerto Rico, resistance 72.

on vegetables in Venezuela 160.

in Venezuela 142

on Vitis in Mexico 118.

Meloidogyne arenaria

on *Caladium* in Guatemala 50.

on *Coffea* in Jamaica 59.

on *Dioscorea* spp. in Guatemala 50.

on *Solanum aviculare* in Guatemala 50.

Meloidogyne exigua

on *Citrus* in French West Indies 134.

on *Coffea* in Central America 42.

in Colombia 21.

in Dominica 133.

in Guatemala 41, 145, 187.

pathogenicity 44.

in Mexico 192.

in Venezuela 126.

on *Coffea robusta* in Guatemala, resistance 87.

on crops in Trinidad, economic loss 121.

on weeds in Trinidad, economic loss 121.

Meloidogyne hapla

on *Chrysanthemum frutescens* in Colombia 207.

on weeds in Colombia 207.

Meloidogyne incognita

on *Ananas comosus* in Puerto Rico, control by crop rotation 91, 103, 161.

control by nematicides 103.

on *Capsicum frutescens* in Venezuela 202.

on *Carica papaya* in Puerto Rico, control by nematicides 163.

on *Cinchona micrantha* in Guatemala 16.

on *Coffea* in Guatemala 41.

on *Colocasia esculenta* in Trinidad 198.

on crops in Trinidad, economic loss 121.

on *Dioscorea* sp. in Guatemala, pathology 55.

on Dioscorea spp. in Guatemala 50, 51.

on Lycopersicon esculentum in Puerto Rico 61.

on Musa sp. in Bermuda 60.

in Cuba 99.

on Nicotiana tabacum in Central America 42.

in Panama 35, 39.

in Trinidad 224.

on ornamentals in Puerto Rico 58.

on Pandanus veitchii in Bermuda, new record (h.) 60.

on Saccharum officinarum in Venezuela 220.

on Scabiosa atropurpurea in Bermuda, new record (h.) 60.

on Solanum melongena in Panama 39.

on Solanum tuberosum in Panama 39.

on weeds in Trinidad, economic loss 121.

in Venezuela 220.

Meloidogyne incognita acrita

on Hibiscus cannabinus in Guatemala 52.

on Musa textilis in Costa Rica 23.

in Honduras 23.

in Panama 23.

Meloidogyne javanica

on Cajanus cajan in Puerto Rico 53.

on crops in Trinidad, economic loss 121.

on weeds in Trinidad, economic loss 121.

Mesodorylaimus globiceps n.sp. in Venezuela 68.

Mesorhabditis capitata n.sp. in Venezuela 68.

Mexico,

Acrobeloides cubaensis 47.

Acrobeloides tlaxcalensis n.sp. 47.

Aphelenchoides cocophilus 25.

Aphelenchoides hodsoni 47.

Criconema 204.

Criconemoides xenoplax 118.

Ditylenchus dipsaci 192.

Helicotylenchus 192, 204.

Heterodera sp. 65.

Heterodera marioni 19.

Heterodera mexicana n.sp. 107.

Heterodera punctata 192.

Hirschmanniella 192.

Longidorus 204.

Meloidogyne 204.

Meloidogyne sp. 37.

Meloidogyne spp. 118, 155, 183.

Meloidogyne exigua 192.

nematodes on *Musa* sp. 153.

Pratylenchus 19, 192, 204.

Pratylenchus thornei 152.

Pratylenchus vulnus 118.

Radopholus similis 116, 141, 192.

Rotylenchus 19.

Rotylenchus bradys 47.

Tylenchorhynchus 192.

Tylenchulus semipenetrans 192.

Xiphinema 204.

Xiphinema americanum 118.

Meylonema on crops in Venezuela 137.

Mononchus piracicabae n.sp. in soil in São Paulo 21.

Mononchus venezolonus n.sp. in Venezuela 68.

Mononchus (Iotonchus) piracicabae n.sp. in soil in São Paulo 21.

Montserrat, nematodes on Lycopersicon esculentum 201.

Musa sp.,

black head disease on 66.

Helicotylenchus sp. on 134a.

Helicotylenchus spp. on 134, 136.

Helicotylenchus multicinctus on 80, 81, 92, 99, 108, 124, 129, 180.

Meloidogyne sp. on 39, 134a.

Meloidogyne incognita on 60, 99.

nematodes on 96, 106, 123, 135, 140, 153, 172, 180, 206.

nematodes & Cercospora on 11.

Pratylenchus sp. on 134a.

Pratylenchus spp. on 134.

Radopholus sp. on 134a.

Radopholus similis on 30, 33, 43, 59, 80, 81, 84, 92, 96, 99, 108, 116, 124, 12
134, 136, 141, 143, 156, 159, 180, 199, 209, 210.

Rotylenchulus sp. on 108, 124, 139, 144, 171.

Rotylenchulus reniformis on 60, 99, 159, 170.

Rotylenchus on 140.

Rotylenchus coffeae on 99.

Musa spp.,

nematodes on 221, 222.

Musa cavendishii, Rotylenchulus reniformis on 60.

Musa paradisiaca,

Heterodera marioni on 18.

Pratylenchus sp. on 151.

Pratylenchus coffeae on 194, 223.

Radopholus similis on 58.

Musa sapientium, Radopholus similis on 58.

Musa textilis,

Meloidogyne incognita acrita on 23.

Pratylenchus coffeae on 223.

Pratylenchus musicola on 23.

Radopholus similis on 23.

Mydonomus spiralis n.g., n.sp. in Puerto Rico 76.

Nannomermis infestans n.sp. in Puerto Rico 102.

Nematicides,

Agrocide 109.

aldicarb 104, 139, 199.

aldrin 140.

Bay 68138 *see* fenamiphos

calcium cyanamide 11.

DBCP 49, 78, 80, 92, 114, 127, 139, 140, 143, 151, 159, 164, 199, 208.

D-D 13, 24, 37, 56, 96, 98, 103, 114, 115, 152, 162, 164, 200.

Dasanit *see* fensulfothion

Di-Trapex (D-D plus methyl isothiocyanate) 167.

DuPont 1410 *see* oxamyl

EDB 24.

Endrin 109.

fenamiphos 116, 139, 143, 163, 164, 199, 200.

fensulfothion 104, 164, 167, 200.

formaldehyde 37.

Fumazone *see* DBCP

Lannate *see* methomyl

methomyl 167, 199.

methyl bromide 127.

Nemacur *see* fenamiphos

Nemacur P *see* fenamiphos

Nemagon *see* DBCP

oxamyl 163.

Penite 158.

phenamiphos *see* fenamiphos

phorate 104, 116.

Temik *see* aldicarb

thimet *see* phorate

thionazin 208.

Tirpate (2,4-dimethyl-2-formyl-1,3-dithiolane oxime N-methylcarbamate) 200.

Tordone 101 158.

various 38, 103, 110, 122, 162, 172, 177, 186, 215, 219.

Vidden D *see* D-D

Vorlex (D-D plus methyl isothiocyanate) 164.

Weedicide 158.

Nematodes

on *Ananas comosus* in Puerto Rico 45.

on *Andropogon* in Cuba 175.

on *Beta vulgaris* in Nicaragua 31.

on *Brassica oleracea capitata* in Nicaragua 31.

on *Carica papaya* in Guyana 123.

& *Cercospora* on *Musa* sp. in Guadeloupe, control by calcium cyanamide 11.

on *Citrus* in Puerto Rico 73.

on *Coffea* in Central America, control by D-D 115.

control by fertilizers 115.

in Guatemala 40, 41.

in Guyana 123.

in Surinam [not found] 120.

in Venezuela, survey 126.

on crops in Colombia, report 121a.
in French Antilles 211.
in Puerto Rico 73.
report 120a.
in Trinidad, survey 197.
in Venezuela 203.
in West Indies, control by nematicides 140.
on Crotalaria striata in Nicaragua 31.
on Daucus carota in Nicaragua 31.
on Digitaria in Cuba 175.
on Dioscorea in Jamaica, control by hot water 208.
control by nematicides 208.
on Echinochloa in Cuba 175.
on Eleusine in Cuba 175.
in French Antilles, survey 212.
on fruit crops in Puerto Rico 73.
on fruit trees in Jamaica, survey 67.
& Fusarium on Cybopogon citratus in Guatemala 126a.
on Hibiscus cannabinus in Guyana 123.
on Lycopersicon esculentum in Colombia 165.
control by crop rotation 131.
in Guyana 123.
in Jamaica, control by crop rotation 12.
in Montserrat, economic loss 201.
in Nicaragua 31.
on Manihot esculenta in West Indies 140.
on Musa sp. in Costa Rica 206.
in Dominica 106.
in Guyana 123.
in Jamaica, control by D-D 96.
in Mexico 153.

in St. Lucia, seasonal dynamics 140.
in Surinam, control 135, 180.
pathology 180.
in Windward Islands, control by nematicides 172.
on Musa spp. in Venezuela 221, 222.
on Nicotiana tabacum in Guyana 123.
in Puerto Rico 7.
on ornamentals in Puerto Rico 73.
on Oryza sativa in Guyana 123.
on Phaseolus vulgaris in Colombia, control by crop rotation 131.
on pepper in Puerto Rico, control by nematicides 186.
on Piper nigrum in Guyana 123.
on Saccharum officinarum in Cuba 97.
listed 36.
in Guyana 123.
in Puerto Rico 178.
control by cultivation & nematicides 38.
control by nematicides 38, 78.
in soil in Venezuela 220.
on vegetables in Puerto Rico, control by nematicides 215.
on Zingiber officinale in Guyana 123.
Nematodes, free-living, in Barbados 205.
Nematodes, plant-parasitic,
in Barbados 205.
in Cuba 85.
in Panama, survey 156.
in Puerto Rico 74.
in tap water in Puerto Rico 185.
in Venezuela, bibliography 27.
survey 160.

Nematology

in Venezuela 5.

in West Indies 124a.

Neoactinolaimus agilis n.g., n.sp. in Puerto Rico 102.

Neotylenchus on crops in Venezuela 137.

Nicaragua,

nematodes on Beta vulgaris 31.

on Brassica oleracea capitata 31.

on Crotalaria striata 31.

on Daucus carota 31.

on Lycopersicon esculentum 31.

Rhadinaphelenchus cocophilus 216.

Nicotiana tabacum,

Helicotylenchus sp. on 35, 42.

Heterodera marioni on 9, 24.

Meloidogyne on 122, 130.

Meloidogyne sp. on 20, 32.

Meloidogyne spp. on 160.

Meloidogyne incognita on 35, 39, 42, 224.

nematodes on 7, 123.

Pratylenchus sp. on 35.

Pratylenchus spp. on 42.

Pratylenchus penetrans on 224.

Radopholus similis on 84.

Trichodorus sp. on 35.

Nothocriconemoides lineolatus n.g., n.sp. in soil in Surinam 181.

Nygellus on crops in Venezuela 137.

Oryza sativa,

Aphelenchoides oryzae on 39.

Aphelenchus on 146.

Criconemoides on 146.

Dorylaimus limnophilus on 175.

Helicotylenchus on 146.

Hemicycliophora on 146.

Hirschmanniella on 192.

Hirschmanniella sp. on 156.

Hirschmanniella oryzae on 160.

Hirschmanniella spinicaudata on 160.

Hysoperine n.sp. on 174.

nematodes on 123.

Panagrolaimus hygrophilus on 175.

Pratylenchus zeae on 175.

Psilenchus on 146.

Rotylenchus on 146.

Tylenchus on 146.

Oxydirus tenuicaudatus n.sp. in Puerto Rico 76.

Oxydirus tropicus n.sp. in Puerto Rico 76.

Palm,

Helicotylenchus tropicus n.sp. on 79.

Rhadinaphelenchus cocophilus on 148.

Palm, oil, *Rhadinaphelenchus cocophilus* on 160.

Panagrolaimus hygrophilus on *Oryza sativa* in Cuba 175.

Panama,

Aphelenchus 156.

Gracilacus 156.

Helicotylenchus 156.

Helicotylenchus sp. 35, 39.

Helicotylenchus spp. 101.

Helicotylenchus dihystera 190, 191.

Helicotylenchus microcephalus 190, 191.

Heterodera rostochiensis 112, 117.

Hirschmanniella sp. 156.

Longidorus 101.

Meloidogyne 156.

Meloidogyne sp. 39, 190, 191.

Meloidogyne incognita 35, 39.

Meloidogyne incognita acrita 23.

nematodes, plant-parasitic 156.

Paratylenchus 156.

Pratylenchus 156.

Pratylenchus sp. 35.

Pratylenchus coffeae 223.

Pratylenchus musicola 23.

Radopholus similis 23, 156.

Rotylenchulus 156.

Rotylenchulus reniformis 190, 191.

Scutellonema sp. 156.

Trichodorus 156.

Trichodorus sp. 35.

Trichodorus spp. 39.

Tylenchorhynchus sp. 39.

Tylenchulus 156.

Tylenchus spp. 101.

Xiphinema 101.

Xiphinema spp. 39.

Pandanus veitchii, Meloidogyne incognita on 60.

Paractinolaimus baldus n.sp. in Puerto Rico 102.

Paractinolaimus robustus n.sp. in Puerto Rico 102.

Paractinolaimus vigor n.sp. in Puerto Rico 102.

Paratylenchus

on fruit crops in Panama 156.

on Saccharum officinarum in Puerto Rico 114.

Passiflora sp., Xiphinema surinamense n.sp. on 214.

Pathoaphelenchus spp. on Saccharum officinarum in Jamaica 2.

Pathogenicity,

Anguillulina similis 10.

Meloidogyne exigua 44.

Pratylenchus coffeae 44.

Rotylenchulus sp. 108.

Scutellonema bradys 94.

Pathology,

Ditylenchus 137.

Helicotylenchus 137.

Helicotylenchus multicinctus 180.

Meloidogyne 137.

Meloidogyne incognita incognita 55.

nematodes on Musa sp. 180.

Radopholus similis 180.

Rhadinaphelenchus 137.

Tylenchulus 137.

Peltamigratus browni n.sp. on Ananas sativus in Trinidad 111.

Peltamigratus holdemani n.sp. in soil in Costa Rica 71.

Peltamigratus luci n.sp. on Ananas sativus in Martinique 71.

Peltamigratus macbethi n.sp. on Solanum in Venezuela 71.

Peltamigratus pachyurus n.sp. in Venezuela 68.

Peltamigratus thornei n.sp. on Cocos nucifera in Central America 128.

Pepper

see also Capsicum, Piper

nematodes on 186.

Persea americana, Helicotylenchus flatus n.sp. on 79.

Phaseolus vulgaris,

nematodes on 131.

Radopholus similis on 84.

Rotylenchulus reniformis on 191.

Phellonema cylindrica n.g., n.sp. in Puerto Rico 76.

Philodendron pertusum, Radopholus similis on 58.

Piper nigrum, nematodes on 123.

Plants,

Helicotylenchus dihystera on 73.

Helicotylenchus multicinctus on 100.

Meloidogyne sp. on 100.

Rotylenchulus reniformis on 64, 100.

Tylenchulus semipenetrans on 73, 124

Tylenchus spp. on 73.

Xiphinema spp. on 73.

Plants (crops),

Aphelenchus on 156.

Bastiania on 137.

Cobbanatus on 137.

Cryptonchus on 137.

Ditylenchus on 137.

Helicotylenchus on 137, 150, 156, 217.

Helicotylenchus sp. on 39.

Helicotylenchus dihystera on 190.

Helicotylenchus microcephalus on 190.

Heterodera on 137.

Heterodera marioni on 24.

Meloidogyne on 82, 137, 150, 156, 217.

Meloidogyne sp. on 121, 190.

Meloidogyne exigua on 121.

Meloidogyne incognita on 121.

Meloidogyne javanica on 121.

Meylonema on 137.

nematodes on 73, 120a, 121a, 140, 197, 203, 211.

Neotylenchus on 137.

Nygellus on 137.

Pratylenchus on 150, 156.

Pseudhalenchus on 137.

Rhadinaphelenchus on 137.

Roqueus on 137.

Rotylenchulus on 150, 156.

Rotylenchulus reniformis on 83, 134, 190.

Rotylenchus on 217

Sporonchulus on 137.

Trachypleurosum on 137.

Trichodorus on 156.

Trichodorus spp. on 39.

Trophurus sp. on 134.

Tylenchorhynchus on 150, 217.

Tylenchorhynchus sp. on 39.

Tylenchulus on 137.

Tylenchus on 217.

Xiphinema spp. on 39.

Plants (fruit),

Gracilacus on 156.

nematodes on 73.

Paratylenchus on 156.

Plants (mosses), *Helicotylenchus thornei* n.sp. on 79.

Plants (ornamentals),

Helicotylenchus nannus on 58.

Meloidogyne incognita on 58.

nematodes on 73.

Pratylenchus spp. on 58.

Radopholus similis on 58.

Rotylenchulus reniformis on 58.

Trichodorus spp. on 58.

Tylenchulus on 156.

Tylenchus spp. on 58.

Plants (trees, fruit), nematodes on 67.

Plants (vegetables),

Belonolaimus longicaudatus on 104.

Helicotylenchus dihystera on 191.

Helicotylenchus microcephalus on 191.

Heterodera marioni on 14, 22.

Meloidogyne sp. on 124.

Meloidogyne spp. on 160

nematodes on 215.

Trichodorus christiei on 104.

Plants (weeds),

Aphelenchoides bicaudatus on 220.

Aphelenchus avenae on 220.

Helicotylenchus sp. on 139.

Helicotylenchus dihystera on 220.

Heterodera marioni on 19.

Macroposthonia spp. on 220.

Meloidogyne sp. on 121.

Meloidogyne exigua on 121.

Meloidogyne hapla on 207.

Meloidogyne incognita on 121, 220.

Meloidogyne javanica on 121.

Pratylenchus zeae on 220.

Tylenchus spp. on 220.

Poncenema striata n.g., n.sp. in Puerto Rico 76.

Pothos aureus, *Radopholus similis* on 58.

Pratylenchus

on *Ananas comosus* in Mexico 19, 204.

on crops in Colombia, control by crop rotation 150.

in Panama 156.

on *Cybopogon citratus* in Guatemala 126a.

on *Saccharum officinarum* in Puerto Rico, control by DBCP 49.

control by nematicides 78.

on *Zea mays* in Mexico 192.

Pratylenchus sp.

on *Musa* sp. in Dominica, crop rotation 134a.

on *Musa paradisiaca* in Trinidad, control by DBCP 151.

on *Nicotiana tabacum* in Panama 35.

Pratylenchus spp.

on *Coffea* in Guatemala, control by D-D 56.

on *Musa* sp. in French West Indies 134.

on *Nicotiana tabacum* in Central America 42.

on ornamentals in Puerto Rico 58.

on Saccharum officinarum in Puerto Rico, 28, 114.

Pratylenchus brachyurus

on Dioscorea sp. in Guatemala 55.

& Pythium graminicola on Saccharum officinarum in Puerto Rico 154.

Pratylenchus coffeae

on Abaca in Panama 223.

on Coffea in Dominica 133.

in El Salvador 145.

in Guatemala 41, 187.

pathogenicity 44.

in Jamaica 59.

in Venezuela 126.

on Coffea robusta in Guatemala, resistance 87.

on Dioscorea alata in Puerto Rico, control by nematicides 162.

control by warm water 162.

on Musa paradisiaca in Honduras 194, 223.

on Musa textilis in Panama 223.

Pratylenchus crenatus in Venezuela 142.

Pratylenchus musicola

on Musa textilis in Costa Rica 23.

in Honduras 23.

in Panama 23.

Pratylenchus penetrans on Nicotiana tabacum in Trinidad 224.

Pratylenchus thornei on Triticum aestivum in Mexico, control by D-D 152.

Pratylenchus vulnus on Vitis in Mexico 118.

Pratylenchus zeae

on Oryza sativa in Cuba 175.

on Saccharum officinarum in Cuba 176.

in Venezuela 220.

on weeds in Venezuela 220.

Pseudhalenchus on crops in Venezuela 137.

Psilenchus

on *Oryza sativa* in Guyana 146.

on *Saccharum officinarum* in Puerto Rico 28.

Puerto Rico,

Agmodorus aberrans n.g., n.sp. 76.

Aphelenchoides 28.

Aphelenchus 28.

Axonchium amphidium n.sp. 76.

Axonchium amplicolle 76.

Axonchium arcuatum n.sp. 76.

Axonchium baldum n.sp. 76.

Axonchium rotundum n.sp. 76.

Belondira cylindrica n.sp. 76.

Belondira parva n.sp. 76.

Belondira porta n.sp. 76.

Belondira sacca n.sp. 76.

Belondira tenuidens n.sp. 76.

Belondirella teres n.g., n.sp. 76.

Belondiroidea n.superf. 76.

Belonenchidae n.fam. 76.

Belonenchus n.g., n.sp. 76.

Belonolaimus lineatus 114.

Belonolaimus lineatus n.sp. 70.

Belonolaimus longicaudatus 104.

Criconema 114.

Criconemoides 28, 49, 91, 161.

Criconemoides spp. 114.

Ditylenchus 114.

Ditylenchus spp. 28.

Dorylaimoides brevidens n.sp. 76.

Dorylaimoides intermedius n.sp. 76.

Dorylaimoides reversus n.sp. 76.

Dorylaimoides similis n.sp. 76.

Dorylalusimel clavatus n.sp. 76.

Dorylalusimel filicaudatus n.sp. 76.

Dorylalusimel labiatus n.sp. 76.

Doryllium flagum n.sp. 76.

Doryllium nudum n.sp. 76.

Doryschota apitica n.g., n.sp. 76.

Helicotylenchus 45, 49, 78, 91, 161.

Helicotylenchus sp. 103.

Helicotylenchus spp. 28, 114.

Helicotylenchus apiculus n.sp. 79.

Helicotylenchus boringuensis n.sp. 79.

Helicotylenchus caribensis n.sp. 79.

Helicotylenchus concavus n.sp. 48.

Helicotylenchus curvatus n.sp. 79.

Helicotylenchus dihystera 73.

Helicotylenchus elegans n.sp. 79.

Helicotylenchus flatus n.sp. 79.

Helicotylenchus labiatus n.sp. 79.

Helicotylenchus nannus 58.

Helicotylenchus spicaudatus n.sp.

Helicotylenchus thornei n.sp. 79.

Helicotylenchus tropicus n.sp. 79.

Helicotylenchus truncatus n.sp. 79.

Hemiriconemoides 49.

Hemicriconemoides spp. 114.

Hemicycliophora 114.

Heterodera marioni 9.

Hoplolaimus 114.

Hoplolaimus spp. 28.

Hoplolaimus puertoricensis n.sp. 69.

Leptonchidae 76.

Leptonchus granulosus 76.

Longidorus 28, 114.

Meloidogyne 45, 49, 78, 162, 200.

Meloidogyne spp. 72, 98, 114.

Meloidogyne incognita 58, 61, 91, 103, 161, 163.

Meloidogyne javanica 53.

Mydonomus spiralis n.g., n.sp. 76.

nematodes on *Ananas comosus* 45.

on *Citrus* 73.

on crops 73, 120a.

on fruit crops 73.

on *Nicotiana tabacum* 7.

on ornamentals 73.

on pepper 186.

plant-parasitic 74, 185.

on *Saccharum officinarum* 38, 78, 178.

on vegetables 215.

Oxydirus tenuicaudatus n.sp. 76.

Oxydirus tropicus n.sp. 76.

Paratylenchus 114.

Phellonema cylindrica n.g., n.sp. 76.

Poncenema striata n.g., n.sp. 76.

Pratylenchus 49, 78, 114.

Pratylenchus spp. 28, 58.

Pratylenchus brachyurus 154.

Pratylenchus coffeae 162.

Psilenchus 28.

Radopholus similis 58.

Rogueus garcilis n.g., n.sp. 76.

Rotylenchulus reniformis 58, 61, 64, 91, 103, 163, 164.

Rotylenchus 28, 45, 49.

Scutellonema blaberum 162.

Scutellonema bradys 162.

Trichodorus 114, 213.

Trichodorus spp. 58.

Trichodorus christiei 104, 179.

Trophurus 114.

Tylencholaimellus acris n.sp. 76.

Tylencholaimellus macrophallus n.sp. 76.

Tylenchorhynchus 28, 49.

Tylenchorhynchus spp. 114.

Tylenchulus semipenetrans 73, 74.

Tylenchus spp. 28, 58, 73.

Tyleptus amalgans n.sp. 76.

Xiphinema 28, 114.

Xiphinema spp. 73.

Xiphinema basiri 73, 74.

Yunqueus variatus n.g., n.sp. 76.

Pythium graminicola & Pratylenchus brachyurus on Saccharum officinarum 154.

Radopholus sp.

on *Citrus* in Jamaica 43.

on *Musa* sp. in Dominica, crop rotation 134a.

Radopholus similis

on *Anthurium acaule* in Puerto Rico 58.

on *Brassica oleracea* in Cuba, resistance 84.

in Central America, host range 173.

on *Citrus* in Jamaica 30.

in Mexico 192.

on *Coffea* in Costa Rica 189.

on *Coffea arabica* in Cuba 84.

in Puerto Rico 58.

on *Commelina* in Windward Islands 159.

on *Gossypium hirsutum* in Cuba, resistance 84.

on *Gossypium hirsutum punctatum* in Puerto Rico 58.

on *Heliconia aurantiaca* in Puerto Rico 58.

on *Hibiscus esculentus* in Cuba 84.

on *Musa* sp. in Costa Rica 209, 210.

in Cuba 99.

control by DBCP 92.

control by hot water 80, 92, 143.

control by nematicides 80, 143.

control reviewed 81.

development 81.

life-history 81.

morphology 81.

susceptibility 84.

in French West Indies 134.

in Jamaica 30, 43, 59, 96.

control by nematicides 199.

in Mexico 141.

control by nematicides 116.

in Panama 156.

in Surinam 136.

control 180.

control by flood fallowing 129.

pathology 180.

in Trinidad 33.

in Windward Islands 108,124.

control by DBCP 159.

Musa paradisiaca in Puerto Rico, control discussed 58.

Musa sapientium in Puerto Rico, control discussed 58.

Musa textilis in Costa Rica 23.

in Honduras 23.

in Panama 23.

Nicotiana tabacum in Cuba, susceptibility 84.

ornamentals in Puerto Rico, control discussed 58.

on Phaseolus vulgaris in Cuba, resistance 84.

on Philodendron pertusum in Puerto Rico 58.

on plants in Cuba, host trials 84.

on Pothos aureus in Puerto Rico 58.

on Saccharum officinarum in Cuba, susceptibility 84.

on Sesamum indicum in Cuba, resistance 84.

on Theobroma cacao in Costa Rica 189.

on Vigna sinensis in Cuba 84.

on Zea mays in Cuba, susceptibility 84.

Red ring disease on Cocos nucifera in Trinidad 125.

Resistance,

Meloidogyne spp. 72, 183.

Meloidogyne exigua 87.

Pratylenchus coffeae 87.

Radopholus similis 84.

Rhadinaphelenchus on crops in Venezuela, pathology 137.

Rhadinaphelenchus cocophilus

see also *Aphelenchoides cocophilus*

on *Cocos nucifera* in British Guiana 54.

in Colombia 193.

control by killing infected trees 196.

control by nematicides 158.

in Guyana 146, 188.

in Nicaragua 216.

in Surinam 90.

control by flood fallowing 129.

in Trinidad 105.

control by nematicides 110, 117.

in Trinidad & Tobago 57, 62, 138.

control by nematicides 109.

in Venezuela 160.

in Windward Islands 124.

on oil palm in Venezuela 160.

on palm in Surinam 148.

in *Rhynchophorus* in Venezuela 149.

Rhynchophorus, *Rhadinaphelenchus cocophilus* in 149.

Roqueus on crops in Venezuela 137.

Roqueus gracilis n.g., n.sp. in Puerto Rico 76.

Rotylenchulus

on crops in Colombia, control by crop rotation 150.

in Panama 156.

n.sp. [not described] on *Cocos nucifera* in Jamaica 59.

on *Solanum tuberosum* in Colombia 132.

Rotylenchulus sp.

on *Commelina* sp. in Windward Islands 171.

on *Commelina* in Windward Islands, control by nematicides 139.

on *Musa* sp. in Windward Islands 124, 171.

control by fallowing 144.

control by nematicides 139.

pathogenicity 108.

Rotylenchulus reniformis

on *Abelmoschus esculentus* in Trinidad 218.

on *Allium cepa* in Venezuela 202.

on *Ananas comosus* in Puerto Rico, control by crop rotation 91, 103.

control by nematicides 103.

on *Cajanus cajan* in Puerto Rico, control by nematicides 164.

in Trinidad 218.

on *Capsicum frutescens* in Panama 191.

in Venezuela 202.

on *Carica gracilis* in Trinidad 218.

on *Carica papaya* in Cuba 83.

in Puerto Rico, control by nematicides 163.

on *Commelina* in Windward Islands 159.

on *Commelina* sp. in St. Lucia 170.

on crops in Cuba, non-hosts listed 83.

in French West Indies 134.

in Panama 190.

on *Cucumis melo* in Cuba 83.

on *Cucumis sativus* in Cuba 83.

on *Daucus carota* in Venezuela 202.

on *Glycine max* in Cuba 83.

on *Ipomoea batatas* in Cuba 83.

in West Indies 197.

on Lycopersicon esculentum in Colombia 166.
in Cuba 83.
in Puerto Rico 61.
in Venezuela 202.
on marigold in Venezuela 202.
on Musa sp. in Bermuda 60.
in Cuba 99.
in St. Lucia 170.
in Windward Islands, control by DBCP 159.
on Musa cavendishii in Bermuda, new record (h.) 60.
on ornamentals in Puerto Rico 58.
on Phaseolus vulgaris in Panama 191.
on plants in Cuba 100.
in Puerto Rico, bibliography 64.
host list 64.
on Solanum melongena in Cuba 83.
on sorghum in Venezuela 202.
on Vigna sinensis in Bermuda 60.
in Cuba 83.
on Xanthosoma sagittifolium in West Indies 197.
on Zea mays in Venezuela 202.
Rotylenchus
on Ananas comosus in Mexico 19.
in Puerto Rico 45.
on crops in Guyana 217.
on Musa sp. in West Indies 140.
on Oryza sativa in Guyana 146.
on Saccharum officinarum in Puerto Rico 28.
control by DBCP 49.
on Solanum tuberosum in Colombia 132.

Rotylenchus bradys in soil in Mexico 47.

Rotylenchus coffeae on Musa sp. in Cuba 99.

Saccharum officinarum,

Acrobeloides buetschlii on 176.

Anguillulina similis on 10.

Aphelenchoides on 28.

Aphelenchoides bicaudatus on 220.

Aphelenchoides heterophallus n.sp. on 4.

Aphelenchus on 28.

Aphelenchus avenae on 220.

Belonolaimus lineatus on 114.

Belonolaimus lineatus n.sp. on 70.

Criconema on 114.

Criconemoides on 28, 49.

Criconemoides spp. on 114.

Ditylenchus on 36, 114.

Ditylenchus spp. on 28.

Ditylenchus intermedius on 176.

Ditylenchus triformis on 176.

Helicotylenchus on 36, 49, 78.

Helicotylenchus spp. on 28, 114.

Helicotylenchus apiculus n.sp. on 79.

Helicotylenchus borinquesis n.sp. on 79.

Helicotylenchus caribensis n.sp. on 79.

Helicotylenchus concavus n.sp. on 48.

Helicotylenchus curvatus n.sp. on 79.

Helicotylenchus dihystera on 220.

Helicotylenchus elegans n.sp. on 79.

Helicotylenchus truncatus n.sp. on 79.

Hemicriconemoides on 49.

Hemicriconemoides spp. on 114.

Hemicycliophora on 114.

Hoplolaimus on 114.

Hoplolaimus spp. on 28.

Hoplolaimus puertoricensis n.sp. on 69.

Longidorus on 28, 114.

Longidorus laevicapitatus on 93, 134.

Macroposthonia spp. on 220.

Meloidogyne on 49, 78, 220.

Meloidogyne spp. on 98, 114.

nematodes on 36, 38, 78, 97, 123, 178.

Paratylenchus on 114.

Pathoaphelenchus spp. on 2.

Pratylenchus on 49, 78, 220.

Pratylenchus spp. on 28, 114.

Pratylenchus brachyurus & *Pythium graminicola* on 154.

Pratylenchus zeae on 176.

Psilenchus on 28.

Radopholus similis on 84.

Rotylenchus on 28, 49.

Trichodorus on 114.

& *Fusarium* on 213.

Trichodorus christiei & *Fusarium* spp. on 179.

Trophurus on 114.

Tylenchorhynchus on 28, 49.

Tylenchorhynchus spp. on 114.

Tylenchus spp. on 28, 220.

Xiphinema on 28, 114.

St. Lucia,

nematodes on Musa sp. 140.

Rotylenchulus reniformis 170.

St. Vincent, Aphelenchoides cocophilus 26.

Salvia farinacea, Aphelenchoides ritzemabosi on 60.

São Paulo,

Carcharolaimus pizai n.sp. 21.

Cylindrocorpus curzii zamithi n.subsp. 21.

Mononchus piracicabae n.sp. 21.

Scabiosa atropurpurea, Meloidogyne incognita on 60.

Scapidens perplexus n.g., n.sp. in Jamaica 77.

Scutellonema sp. on Dioscorea in Panama 156.

Scutellonema blaberum on Dioscorea alata in Puerto Rico, control by nematicides & warm water 162.

Scutellonema bradys

on Dioscorea alata in Cuba, control 94.

morphology 94.

pathogenicity 94.

in Puerto Rico, control by nematicides & warm water 162.

Sesamum indicum, Radopholus similis on 84.

Soil,

Acrobeloides cubaensis in 47.

Acrobeloides tlaxcalensis n.sp. in 47.

Aphelenchoides hodsoni in 47.

Carcharolaimus pizai n.sp. in 21.

Cylindrocorpus curzii zamithi n.subsp. in 21.

Desmoscolex in 88.

Discocriconemella surinamensis n.sp. in 147.

Helicotylenchus erythrinae in 60.

Heterodera rostochiensis in 195.

Macroposthonia longistyleta n.sp. in 147.

Meloidogyne spp. in 146.

Mononchus piracicabae n.sp. in 21.

nematodes in 220.

Nothocriconemoides lineolatus n.g., n.sp. in 181.

Peltamigratus holdemani n.sp. in 71.

Rotylenchus bradys in 47.

Xiphinema americanum in 60.

Soil (forest), *Helicotylenchus apiculus* n.sp. in 79.

Solanum, *Peltamigratus macbethi* n.sp. on 71.

Solanum aviculare,

Heterodera sp. on 50.

Meloidogyne arenaria on 50.

Solanum melongena,

Heterodera marioni on 8.

Meloidogyne incognita on 39.

Rotylenchulus reniformis on 83.

Solanum rostratum,

Heterodera sp. on 65.

Heterodera mexicana n.sp. on 107.

Solanum tuberosum,

Aphelenchoides on 132.

Criconemoides on 132.

Ditylenchus on 132.

Heterodera on 132.

Heterodera rostochiensis on 112, 117, 169, 182.

Macroposthonia peruensiformis n.sp. on 95.

Meloidogyne on 132.

Meloidogyne sp. on 20.

Meloidogyne incognita on 39.

Rotylenchulus on 132.

Rotylenchus on 132.

Trichodorus on 132.

Tylenchorhynchus on 132.

Tylenchulus on 132.

Xiphinema on 132.

Sorghum,

Helicotylenchus erythrinae on 202.

Rotylenchulus reniformis on 202.

Spathodea campanulata, Meloidogyne spp. on 72.

Sporonchulus on crops in Venezuela 137.

Surinam,

Discocriconemella surinamensis n.sp. 147.

Gracilacus peperpotti n.sp. 63.

Helicotylenchus spp. 136.

Helicotylenchus multicinctus 129, 180.

Macroposthonia denoudeni n.sp. 95.

Macroposthonia longistyleta n.sp. 147.

Macroposthonia peruensiformis n.sp. 95.

nematodes on Coffea 120.

on Musa sp. 135, 180.

Nothocriconemoides lineolatus n.g., n.sp. 181.

Radopholus similis 129, 136, 180.

Rhadinaphelenchus cocophilus on 90, 129, 148.

Xiphinema denoudeni n.sp. 214.

Xiphinema elongatum 214.

Xiphinema filicaudatum n.sp. 214.

Xiphinema imambaksi n.sp. 214.

Xiphinema surinamense n.sp. 214.

Xiphinema vulgare 214.

Theobroma cacao,

Helicotylenchus erythrinae on 219.

Hoplolaimus galeatus on 219.

Radopholus similis on 189.

Trachypleurosum on crops in Venezuela 137.

Trichodorus

on crops in Panama 156.

& *Fusarium* on *Saccharum officinarum* in Puerto Rico 213.

on *Saccharum officinarum* in Puerto Rico 114.

on *Solanum tuberosum* in Colombia 132.

Trichodorus sp. on *Nicotiana tabacum* in Panama 35.

Trichodorus spp.

on crops in Panama 39.

on ornamentals in Puerto Rico 58.

Trichodorus christiei

& *Fusarium* spp. on *Saccharum officinarum* in Puerto Rico 179.

on vegetables in Puerto Rico, control by nematicides 104.

Trinidad,

Aphelenchoides cocophilus 34.

Encholaimus taurus n.g., n.sp. 89.

Helicotylenchus spp. 218.

Heterodera marioni 14.

Heterodera radicicola 1.

Meloidogyne 127.

Meloidogyne sp. 121, 197, 218.

Meloidogyne exigua 121.

Meloidogyne incognita 121, 198, 224.

Meloidogyne javanica 121.

nematodes on crops 197.

Peltamigratus browni n.sp. 111.

Pratylenchus sp. 151.

Pratylenchus penetrans 224.

Radopholus similis 33.

red ring disease 125.

Rhadinaphelenchus cocophilus 105, 110, 177.

Rotylenchulus reniformis 218.

Tylenchulus semipenetrans 86, 157.

Xiphinema 140.

Trinidad & Tobago,

Aphelenchoides cocophilus 29, 33.

Meloidogyne sp. 33.

Rhadinaphelenchus cocophilus 57, 62, 109, 138.

Pratylenchus thornei on 152.

Trophurus on *Saccharum officinarum* in Puerto Rico 114.

Trophurus sp. on crops in French West Indies 134.

Tylencholaimellus acris n.sp. in Puerto Rico 76.

Tylencholaimellus macrophallus n.sp. in Puerto Rico 76.

Tylencholaimus leptonchoides n.sp. in Venezuela 68.

Tylencholaimus maritus n.sp. & *Espeletia* sp. in Venezuela 113.

Tylenchorhynchus

on crops in Colombia, control by crop rotation 150.

in Guyana 217.

on *Saccharum officinarum* in Puerto Rico 28.

control by DBCP 49

on Solanum tuberosum in Colombia 132.

on *Zea mays* in Mexico 192.

Tylenchorhynchus sp.

on crops in Panama 39.

on *Ipomoea batatas* in West Indies 197.

on *Xanthosoma sagittifolium* in West Indies 197.

Tylenchorhynchus spp. on *Saccharum officinarum* in Puerto Rico 114.

Tylenchorhynchus contractus n.sp. in Venezuela 68.

Tylenchulus

on crops in Venezuela, pathology 137.

on ornamentals in Panama 156.

on *Solanum tuberosum* in Colombia 132.

Tylenchulus semipenetrans

on *Citrus* in Bermuda 60.

in British Honduras 157.

in French West Indies 134.

in Jamaica 59.

in Mexico 192.

in Puerto Rico 74.

in Trinidad 157.

in Venezuela 160.

on *Citrus* sp. in Trinidad 86.

on plants in Puerto Rico 73.

in Windward Islands 124.

Tylenchus

on crops in Guyana 217.

on *Oryza sativa* in Guyana 146.

Tylenchus spp.

on *Citrus* in Costa Rica 101.

in Panama 101.

on ornamentals in Puerto Rico 58.

on plants in Puerto Rico 73.

on *Saccharum officinarum* in Puerto Rico 28.

in Venezuela 220.

on weeds in Venezuela 220.

Tyleptus amalgans n.sp. in Puerto Rico 76.

Tyleptus gymnochilus n.sp. in Venezuela 68.

Venezuela,

Acrobeles undulatus n.sp. 68.

Alaimus striatus n.sp. 68.

Aphelenchoides sp. 126.

Aphelenchoides bicaudatus 220.

Aphelenchoides cocophilus 17.

Aphelenchus avenae 126, 142, 220.

Bastiania 137.

Bursaphelenchus digitulus n.sp. 68.

Bursaphelenchus gonzalezi n.sp. 68.

Carcharolaimus drepanodon n.sp. 68.

Chronogaster daoi n.sp. 68.

Cobbonatus 137.

Criconemoides sp. 126.

Criconemoides oostenbrinki n.sp. 68.

Cryptonchus 137.

Discolaimus affinis n.sp. 68.

Discolaimus mucurubanus n.sp. 68.

Ditylenchus 137.

Ditylenchus spp. 142.

Ditylenchus dipsaci 46, 160.

Dorylaimellus longicollis n.sp. 68.

Dorylaimellus nygellurus n.sp. 68.

Dorylaimellus spicatus n.sp. 68.

Dorylaimoides porifer n.sp. 68.

Doryllium longicaudatum n.sp. 68.

Drepanodorus orthodon n.sp. 68.

Eucephalobus pulcher n.sp. 68.

Eudorylaimus morbidus n.sp. 68.

Helicotylenchus 137.

Helicotylenchus sp. 126.

Helicotylenchus dihystera 142, 220.

Helicotylenchus erythrinae 126, 202.

Heterodera 137.

Heterodera rostochiensis 168, 169, 182.

Hirschmanniella oryzae 160.

Hirschmanniella spinicaudata 160.

Macroposthonia spp. 220.

Meloidogyne 130.

Meloidogyne sp. 20.

Meloidogyne spp. 142, 160.

Meloidogyne exigua 126.

Meloidogyne incognita 202, 220.

Mesodorylaimus globiceps n.sp. 68.

Mesorhabditis capitata n.sp. 68.

Meylonema 137.

Mononchus venezolonus n.sp. 68.

nematodes on Coffea 126.

on crops 203.

on Musa spp. 221, 222.

plant-parasitic 27, 160.

in soil 220.

Nematology 5.

Neotylenchus 137.

Nygellus 137.

Peltamigratus macbethi n.sp. 71.

Peltamigratus pachyurus n.sp. 68.

Pratylenchus coffeae 126.

Pratylenchus crenatus 142.

Pratylenchus zeae 220.

Pseudhalenchus 137.

Rhadinaphelenchus 137.

Rhadinaphelenchus cocophilus 149,160.

Roqueus 137.

Rotylenchulus reniformis 202.

Sporonchulus 137.

Trachypleurosum 137.

Tylencholaimus leptonchoides n.sp. 68.

Tylencholaimus maritus n.sp. 113.

Tylenchorhynchus contractus n.sp. 68.

Tylenchulus 137.

Tylenchulus semipenetrans 160.

Tylenchus spp. 220.

Tyleptus gymnochilus n.sp. 68.

Vigna sinensis,

Meloidogyne sp. on 39.

Radopholus similis on 84.

Rotylenchulus reniformis on 60, 83.

Vitis,

Criconemoides xenoplax on 118.

Meloidogyne spp. on 118.

Pratylenchus vulnus on 118.

Xiphinema americanum on 118.

Water (tap), nematodes, plant-parasitic, in 185.

West Indies,

Meloidogyne 140.

nematodes on crops 140.

on Manihot esculenta 140.

Nematology 124a.

Rotylenchulus reniformis 197.

Rotylenchus 140.

Tylenchorhynchus sp. 197.

West Indies, French,

Helicotylenchus spp. 134.

Longidorus laevicapitatus 134.

Meloidogyne exigua 134.

Pratylenchus spp. 134.

Radopholus similis 134.

Rotylenchulus reniformis 134.

Trophurus sp. 134.

Tylenchulus semipenetrans 134.

Westindicus brachycephalus n.g., n.sp. in Puerto Rico 102.

Windward Islands,

Helicotylenchus sp. 139.

Helicotylenchus multicinctus 108, 124.

Meloidogyne sp. 124.

nematodes on Musa sp. 172.

Radopholus similis 108, 124, 159.

Rhadinaphelenchus cocophilus 124.

Rotylenchulus sp. 108, 124, 139, 144, 171.

Rotylenchulus reniformis 159.

Tylenchulus semipenetrans 124.

Xanthosoma sagittifolium,

Meloidogyne sp. on 197.

Rotylenchulus reniformis on 197.

Tylenchorhynchus sp. on 197.

Xiphinema

on Ananas comosus in Mexico 204.

on Citrus in British Honduras 157.

in Costa Rica 101.

in Panama 101.

on Cybopogon citratus in Guatemala 126a.

on Lactuca sativa in Trinidad 140.

on Saccharum officinarum in Puerto Rico 28, 114.

on Solanum tuberosum in Colombia 132.

Xiphinema spp.

on crops in Panama 39.

on plants in Puerto Rico 73.

Xiphinema americanum

on Coffea in Guatemala 187.

control by D-D 56.

in soil in Bermuda 60.

on Vitis in Mexico 118.

Xiphinema basiri

on Citrus in Puerto Rico 73, 74.

Xiphinema denoudeni n.sp. on Citrus in Surinam 214.

Xiphinema elongatum in Surinam 214.

Xiphinema filicaudatum n.sp. on Elaeis guineansis in Surinam 214.

Xiphinema imambaksi n.sp. on Citrus in Surinam 214.

Xiphinema surinamense n.sp.

on Citrus sp. in Surinam 214.

on Passiflora sp. in Surinam 214.

Xiphinema vulgare in Surinam 214.

Yunqueus variatus n.g., n.sp. in Puerto Rico 76.

Zea mays,

Helicotylenchus on 192.

Helicotylenchus erythrinae on 202.

Heterodera punctata on 192.

Pratylenchus on 192.

Radopholus similis on 84.

Rotylenchulus reniformis on 202.

Tylenchorhynchus on 192.

Zingiber officinale, nematodes on 123.

A D D E N D U M

Colombia, nematodes on crops 121a.

Criconemoides on *Cybopogon citratus* in Guatemala 126a.

Cybopogon citratus,

Criconemoides on 126a.

Helicotylenchus on 126a.

Hoplolaimus on 126a.

nematodes & *Fusarium* on 126a.

Pratylenchus on 126a.

Xiphinema on 126a.

Dominica, Meloidogyne sp. 134a.

Fusarium & nematodes on Cybopogon citratus 126a.

Guatemala, Criconemoides 126a.

Helicotylenchus on Cybopogon citratus in Guatemala 126a.

Helicotylenchus sp. on Musa sp. in Dominica, crop rotation 134a.

Hoplolaimus on Cybopogon citratus in Guatemala 126a.

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ANNOTATED BIBLIOGRAPHIES	Period covered	Number of References	Price $	Price £
1. *Cysticercus ovis* and *Taenia ovis*	1932-69	59	1.30	0.50
2. *Taenia saginata* and *T. solium* in Lebanon, Turkey and Yugoslavia	1932-69	50	1.30	0.50
3. Helminthology in Iraq	1932-69	71	1.80	0.70
4. Humpsore (Stephanofilariasis) in domestic animals	1932-69	71	1.80	0.70
5. Skin lesions in domestic animals caused by *Elaeophora*, *Rhabditis* & *Parafilaria*	1932-69	55	1.30	0.50
6. Helminths and plant nematodes of Morocco	1932-70	111	2.60	1.00
7. *Angiostrongylus*	1932-71	210	7.00	2.70
8. Factors influencing the development of *Ascaris* eggs	1932-71	120	3.10	1.20
9. Helminths in archaeological and pre-historic deposits	1910-72	32	1.30	0.50
10. Neurological involvement in *Trichinella spiralis* infection in man	1932-70	51	1.60	0.60
11. White tip disease (*Aphelenchoides besseyi*) of rice in Africa and the tropics	1913-72	150	6.20	2.40
12. Helminths in dogs in Japan	1960-72	89	2.60	1.00
13. Nematodes on soybean (*Glycine max*)	1932-72	184	5.70	2.20
14. *Oswaldocruzia* (Nematoda)	1930-73	29	1.30	0.50
15. Transmission of plant viruses by nematodes	1930-73	120	3.10	1.20
16. Plant nematology in Venezuela	1932-72	21	1.30	0.50
17. *Diorchis*	1931-72	46	3.10	1.20
18. *Nacobbus* (Nematoda: Tylenchida)	1930-73	19	1.30	0.50
19. Plant Nematodes of the Caribbean	1932-73	229	7.13	2.75
20. *Dicrocoelium hospes*	1964-74	11	1.30	0.50
21. Helminths of Vultures	1930-73	34	1.30	0.50
22. *Heloidogyne* on potato and other *Solanum* spp.	1950-74	74	3.10	1.20
23. Cytology of Helminths	1932-74	413	10.30	5.00
24. *Cysticercus* and *Cysticercus ovis*	1930-74	294	7.80	3.00